on the test or tests under discussion. Mean score differences were considered significant at the .05 level when the 95% confidence interval bands between or among groups did not overlap. If they did, the mean score differences were not considered significant.

Growth curves plotted at four testing points (September, November, January, and March) based on the mean percentage scores and standard errors were developed for each of the six reading readiness tests and for each of the sixteen subgroups (2 races X 2 sexes X 2 treatments X 2 ages). The subgroups by chronological ages were (a) young ($\leq$ 74 months) and (b) old ($\geq$ 75 months) all as of September 1, 1964. Confidence limits were at the .05 level of significance.

The data for each subgroup obtained from the reading readiness test battery of six measures were factor analyzed, using the factor analysis BMD Computer Program 03M (Dixon, 1964) to determine if, when, and for which subgroup or subgroups the hypothesized factor patterns emerged and/or changed. The program performed a principal component solution and an orthogonal rotation of the factor matrices. Then the factor matrices were analyzed visually. Unaccounted for variance and percentage contribution of rotated factors to the total reading readiness battery variance (Appendices A to F) were computed for each of the testing periods and for each of the major groups and subgroups.

The reading median scores on the Stanford Achievement Test were subjected to an analysis of variance (2 treatments X 2 races X 2 sexes X 2 ages) with the use of BMD Computer Program 05V (Dixon, 1964). The Newman-Keuls Sequential Range Test (Winer, 1962) was applied to determine pairs of means which differed significantly among effects which had significant F-ratios.

A stepwise multiple regression analysis was made on the six reading readiness tests and the criterion measure for each of the Experimental White, Control White, Experimental Negro, and Control Negro groups at each of the four testing periods with the use of the BMD Computer Program 02R (Dixon, 1964). Variables that increased the coefficient of multiple determination (R^2) by ± .05 were considered as effective predictors and so were included in the multiple regression equations that were generated. Composite weighted scores scaled to the hundreds were calculated for each of the four groups at each of the four testing periods by the use of computer programs prepared by the investigator. On the bases of the composite scores scaled to the hundreds, expectancy tables were prepared for each of the groups at each of the testing periods.

CHAPTER IV

RESULTS AND DISCUSSION: GROWTH CURVES

The data on growth measured by the reading readiness test battery which was administered in September, November, January, and March, 1964-65 are presented for White subjects in Tables 3 to 20 and for Negro subjects in Tables 21 to 38. The tabled data are in percentages. The 95% confidence interval bands represent the limits of the mean percentage ± 1.96 σ_M.

The growth in reading readiness is also presented graphically in Figures 1 to 18 for White subjects and in Figures 19 to 36 for Negro subjects. Each band includes the limits of the 95% confidence interval. Comparisons between or among entries whose confidence interval bands overlap do not represent statistically significant differences; two or more entries whose bands do not overlap are significantly different at the .05 level.

Growth curves of White subjects in Pattern Copying

Table 3 and Figure 1 indicate that the experimental White girls and experimental White boys increased their mean percentage scores in Pattern Copying continuously at each of the four testing periods. The gains made were rapid and significant at the .05 level from September to November and from November to January then were slow and not significant from January to March.

TABLE 3

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PATTERN COPYING FOR WHITE SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls				
Mean	15.3	30.7	46.4	50.2
σ	16.1	17.1	21.6	20.5
σ_M	1.6	1.7	2.1	2.0
95% Confidence	12.2	27.4	42.2	46.3
Interval Band	18.4	34.0	50.5	54.2
Cont. White Girls				
Mean	17.8	19.6	30.6	36.4
σ	13.8	14.4	17.0	18.1
σ_M	1.4	1.4	1.7	1.8
95% Confidence	15.2	16.8	27.4	32.9
Interval Band	20.5	22.4	33.9	39.8
Exp. White Boys				
Mean	20.0	35.3	49.3	55.1
σ	17.9	20.6	20.8	21.5
σ_M	1.7	1.9	2.0	2.0
95% Confidence	16.7	31.5	45.5	51.1
Interval Band	23.4	39.1	53.2	59.1
Cont. White Boys				
Mean	18.9	18.5	32.3	39.0
σ	13.5	14.2	16.9	19.6
σ_M	1.3	1.3	1.6	1.9
95% Confidence	16.4	15.8	29.2	35.3
Interval Band	21.4	21.1	35.5	42.6

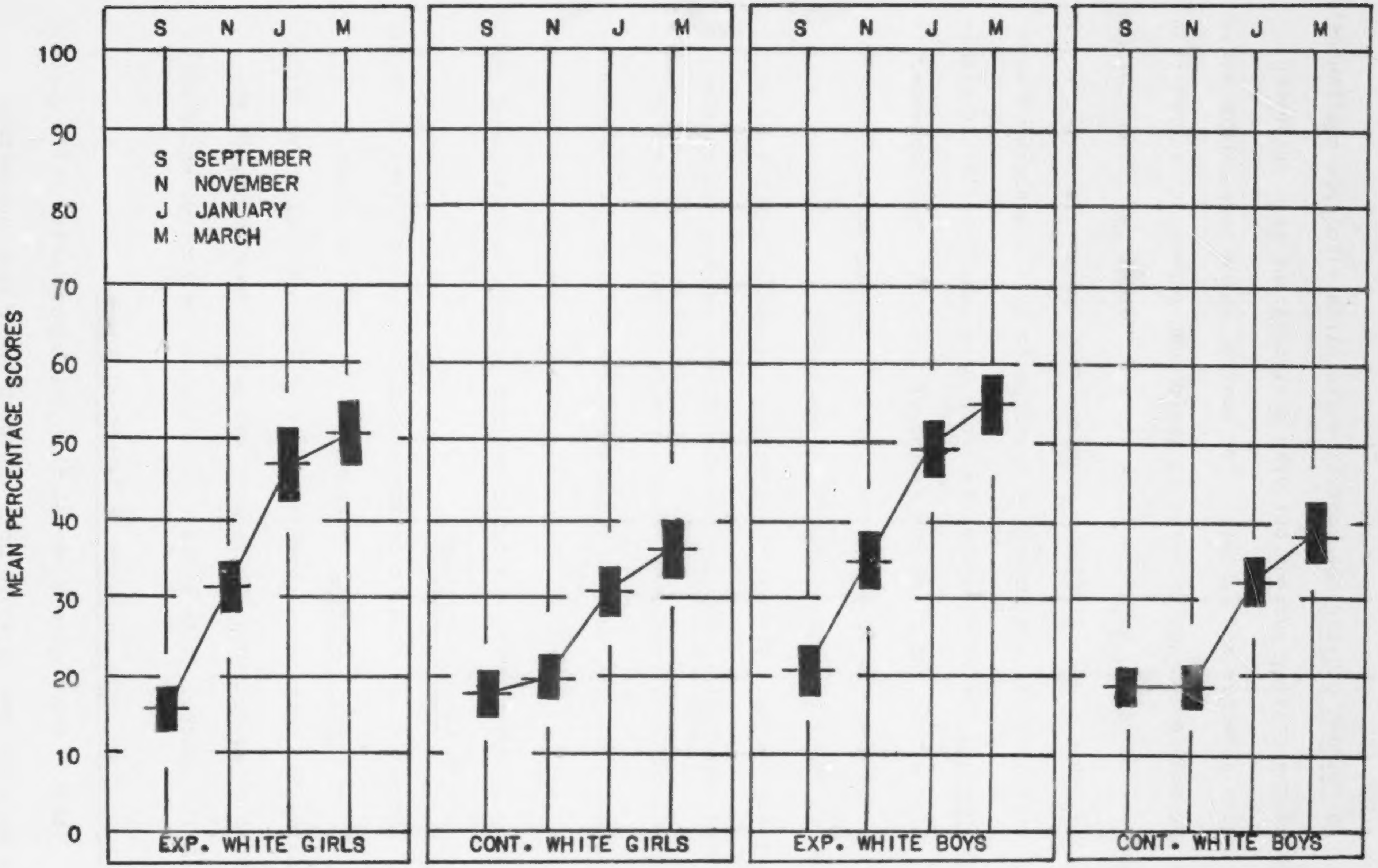


Fig. 1.--Growth curves of White subjects in Pattern Copying.

In Pattern Copying the control White girls also grew continuously at each of the testing periods but with a significant gain occurring only between November and January. For control White boys, there was a slight and nonsignificant decrease in their mean percentage scores from September to November, an appreciable and significant gain from November to January, then a nonsignificant increase from January to March.

With specific and intensive training on skills associated with Pattern Copying, the experimental subjects made considerable and significant gains within the first two months of training (from September to November) and also within the second 2-month training period (from November to January), then a small and nonsignificant increase within the last two months. Without specific and intensive training on skills associated with Pattern Copying but with formal reading instruction, the control subjects took four months from September to January to make a significant gain and to reach the stage attained by the experimental subjects in November. Evidently the experimental treatment was significantly superior to the basal readers program in developing skills associated with Pattern Copying.

There did not seem to be any significant sex differences at any given time in Pattern Copying under either treatment as shown by the overlapping 95% confidence interval bands of experimental White girls with those of experimental White boys and by the overlapping of the bands of the control White girls with those of the control White boys.

Growth curves of White subjects in Identical Forms

Table 4 and Figure 2 reveal that the experimental White girls as well as experimental White boys improved their mean percentage

TABLE 4

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN IDENTICAL FORMS FOR WHITE SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls				
Mean	18.8	34.2	38.2	41.8
σ	12.1	14.6	13.3	13.7
σ_M	1.2	1.4	1.3	1.3
95% Confidence	16.5	31.4	35.6	39.2
Interval Band	21.2	37.0	40.7	44.5
Cont. White Girls				
Mean	28.5	33.1	38.9	43.1
σ	14.0	12.7	17.6	16.1
σ_M	1.4	1.2	1.7	1.6
95% Confidence	25.9	30.7	35.5	40.0
Interval Band	31.2	35.6	42.2	46.2
Exp. White Boys				
Mean	19.2	33.0	36.5	42.2
σ	12.6	12.6	13.5	14.3
σ_M	1.2	1.2	1.3	1.3
95% Confidence	16.9	30.7	34.0	39.6
Interval Band	21.6	35.4	39.0	44.8
Cont. White Boys				
Mean	26.1	32.0	38.4	40.0
σ	12.1	11.9	19.4	14.3
σ_M	1.1	1.1	1.8	1.3
95% Confidence	23.9	29.8	34.8	37.4
Interval Band	28.4	34.2	42.0	42.6

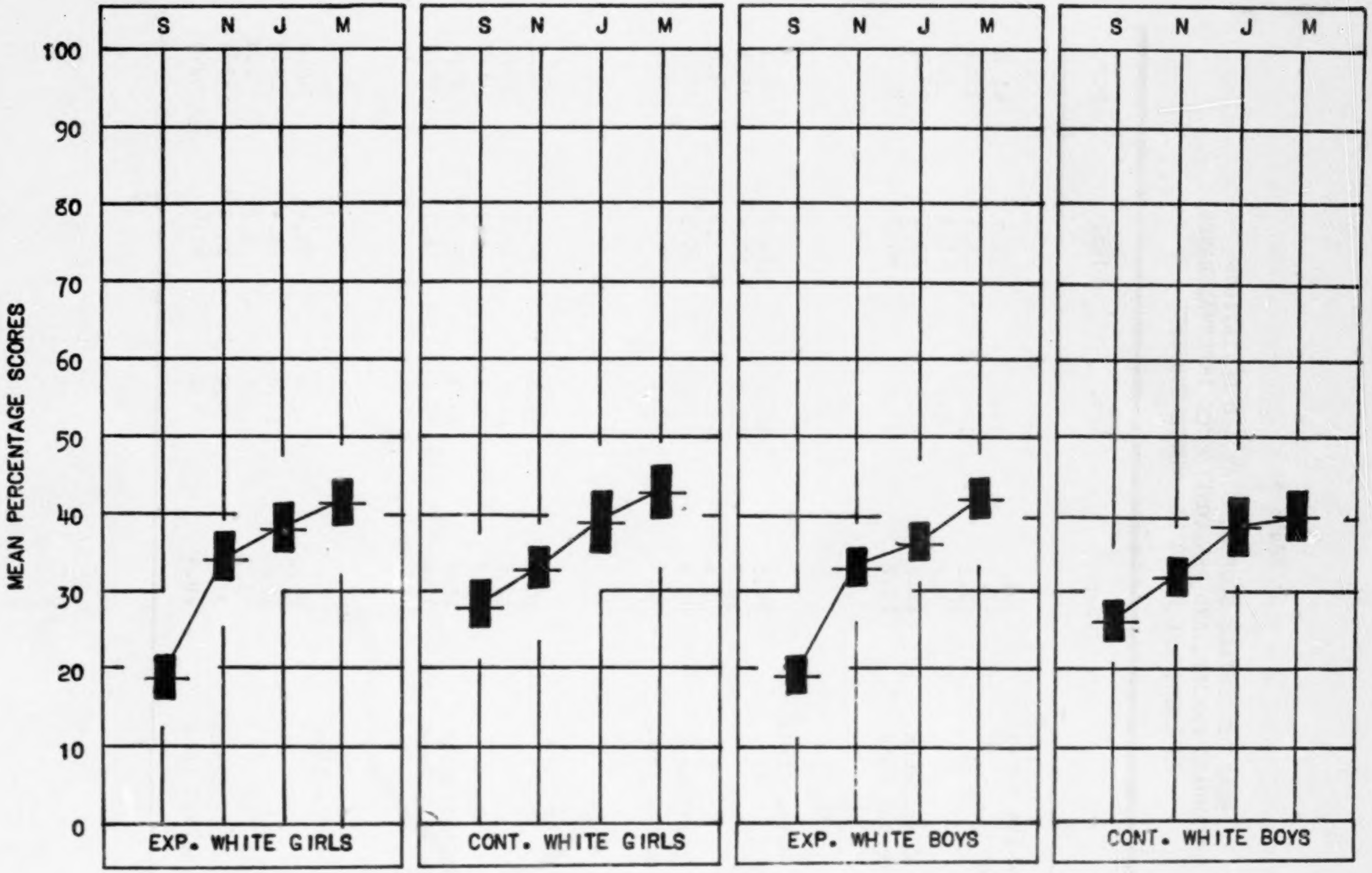


Fig. 2.--Growth curves of White subjects in Identical Forms.

scores in Identical Forms at each of the September, November, January, and March testing periods. For both groups, growth significant at the .05 level was evidenced in November after two months training in reading readiness. The increments from November to January and from January to March were not significant though that made within four months, from November to March was significant.

In Identical Forms the control White girls and control White boys also bettered their mean percentage scores at each of the four testing periods. For the control White girls no gain made within any 2-month testing period was significant as shown by their overlapping bands. The increase from September to January and from November to March, each after four months of formal reading instruction, however, did bring about a significant improvement. For the control White boys, the first two months of formal reading instruction effected growth in Identical Forms significant at the .05 level. The later gains made every two months were not significant though the increase from November to March, after four months of formal reading instruction, was significant.

Although the control White girls and boys started in September with significantly higher scores in Identical Forms than the experimental White girls and boys, after two months the latter surpassed the former but the difference was not significant. In January the non-significant difference favored the control White girls and boys but in March it was in favor of the experimental subjects. The experimental treatment was superior to the basal readers program in the development of Identical Forms skills within the first two months of training.

To determine whether or not significant sex differences existed, performance of the experimental White girls and of the experimental White boys on Identical Forms was compared. The performance of the control White boys and of the control White girls was also compared. The confidence bands of the experimental White girls overlapped with those of the experimental White boys at each of the first, second, third, and fourth testing points, as did the confidence bands of the control White girls and boys. Apparently no significant sex differences in Identical Forms existed among the White subjects under either treatment.

Growth curves of White subjects in Auditory Discrimination

As indicated by Table 5 and Figure 3, the experimental White girls and boys grew continuously and made increases significant at the .05 level on their mean percentage scores in Auditory Discrimination at each of the four testing periods.

The control subjects also made an uninterrupted improvement on their mean scores in Auditory Discrimination at every testing time with significant gains from September to November and from November to January.

There were no significant differences between the experimental treatment and the basal readers program in the development of Auditory Discrimination skills among White subjects as evidenced by the overlapping bands of the four groups at each of the four testing points. However, although the nonsignificant differences in September and November were in favor of the control White girls, the nonsignificant differences in January and March were in favor of the experimental girls. Although the nonsignificant differences in September favored

TABLE 5

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN AUDITORY DISCRIMINATION FOR WHITE SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls				
Mean	20.6	57.0	72.8	82.8
σ	24.7	30.4	28.7	21.9
σ_M	2.4	3.0	2.8	2.1
95% Confidence	15.8	51.2	67.3	78.5
Interval Band	25.3	62.9	78.3	87.0
Cont. White Girls				
Mean	31.0	62.3	69.4	80.6
σ	26.8	30.2	29.6	24.2
σ_M	2.6	3.0	2.9	2.4
95% Confidence	25.8	56.5	63.7	76.0
Interval Band	36.1	68.1	75.1	85.3
Exp. White Boys				
Mean	18.7	55.7	70.2	82.6
σ	22.9	30.6	27.2	20.5
σ_M	2.2	2.9	2.6	1.9
95% Confidence	14.4	50.1	65.2	78.8
Interval Band	22.9	61.4	75.3	86.4
Cont. White Boys				
Mean	24.1	54.6	66.5	75.6
σ	25.9	30.4	30.6	26.3
σ_M	2.4	2.9	2.9	2.5
95% Confidence	19.3	49.0	60.9	70.8
Interval Band	28.9	60.2	72.2	80.5

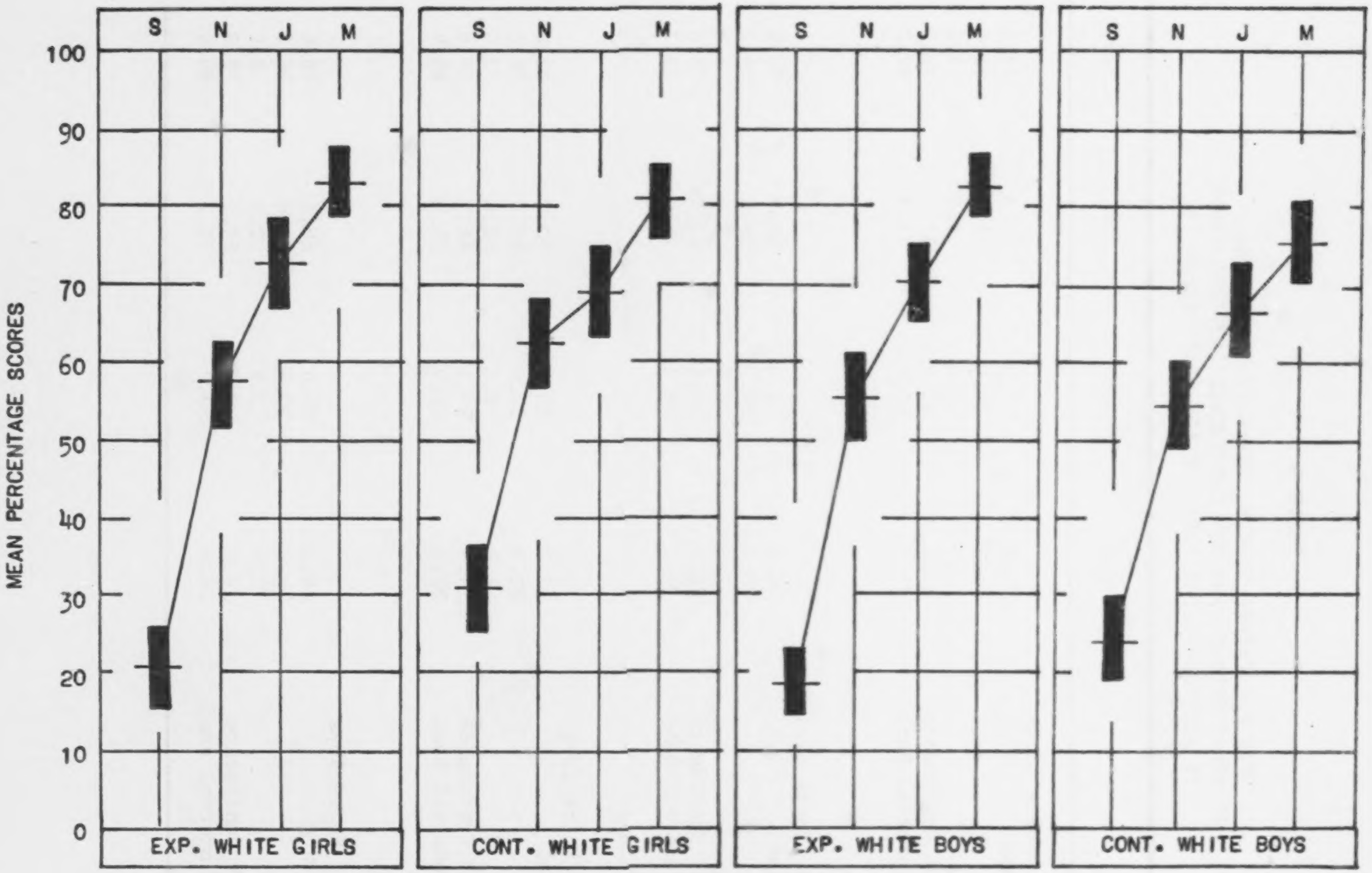


Fig. 3.--Growth curves of White subjects in Auditory Discrimination

the control group of White boys, the nonsignificant differences in November, January, and March favored the experimental White boys.

Differences associated with sex were also investigated. The bands of the White girls and boys under each treatment overlapped throughout the four testing periods which indicated no significant sex differences in Auditory Discrimination.

Growth curves of White subjects in Phonemes

The experimental White girls and boys increased their mean percentage scores in Phonemes considerably and significantly at the .05 level from September to November, a little less but still significantly from November to January, and nonsignificantly from January to March, as shown by the data presented in Table 6 and Figure 4. Although the control White girls and boys also grew continuously from the first to the last testing, a significant gain was made only from September to November.

Obviously there were no significant differences between the experimental treatment and the basal readers program in the development of Phonemes skills among White subjects since the confidence bands of the four groups overlapped at all of the testing points. The control White girls did hold the nonsignificant initial advantage in September and also in November but they were surpassed but not significantly by the experimental girls in January and March. The nonsignificant advantage in September was in favor of the control White boys. They were surpassed by the experimental White boys in November, January, and March but the differences were not large enough to be significant.

TABLE 6

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PHONEMES FOR WHITE SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls				
Mean	39.4	71.1	83.8	88.8
σ	26.4	25.8	21.2	18.3
σ_M	2.6	2.5	2.1	1.8
95% Confidence	34.4	66.1	79.7	85.3
Interval Band	44.5	76.0	87.9	92.3
Cont. White Girls				
Mean	45.8	72.3	80.1	87.5
σ	29.5	27.1	26.2	20.9
σ_M	2.9	2.7	2.6	2.1
95% Confidence	40.1	66.1	75.1	83.5
Interval Band	51.4	76.5	85.1	91.5
Exp. White Boys				
Mean	36.5	68.4	81.4	87.4
σ	25.7	27.2	24.3	19.8
σ_M	2.4	2.6	2.3	1.9
95% Confidence	31.8	63.3	76.9	83.8
Interval Band	41.3	73.4	85.9	91.1
Cont. White Boys				
Mean	45.2	67.0	77.0	82.5
σ	31.0	30.0	27.5	24.6
σ_M	2.9	2.8	2.6	2.3
95% Confidence	39.4	61.5	71.9	77.9
Interval Band	50.9	72.6	82.1	87.0

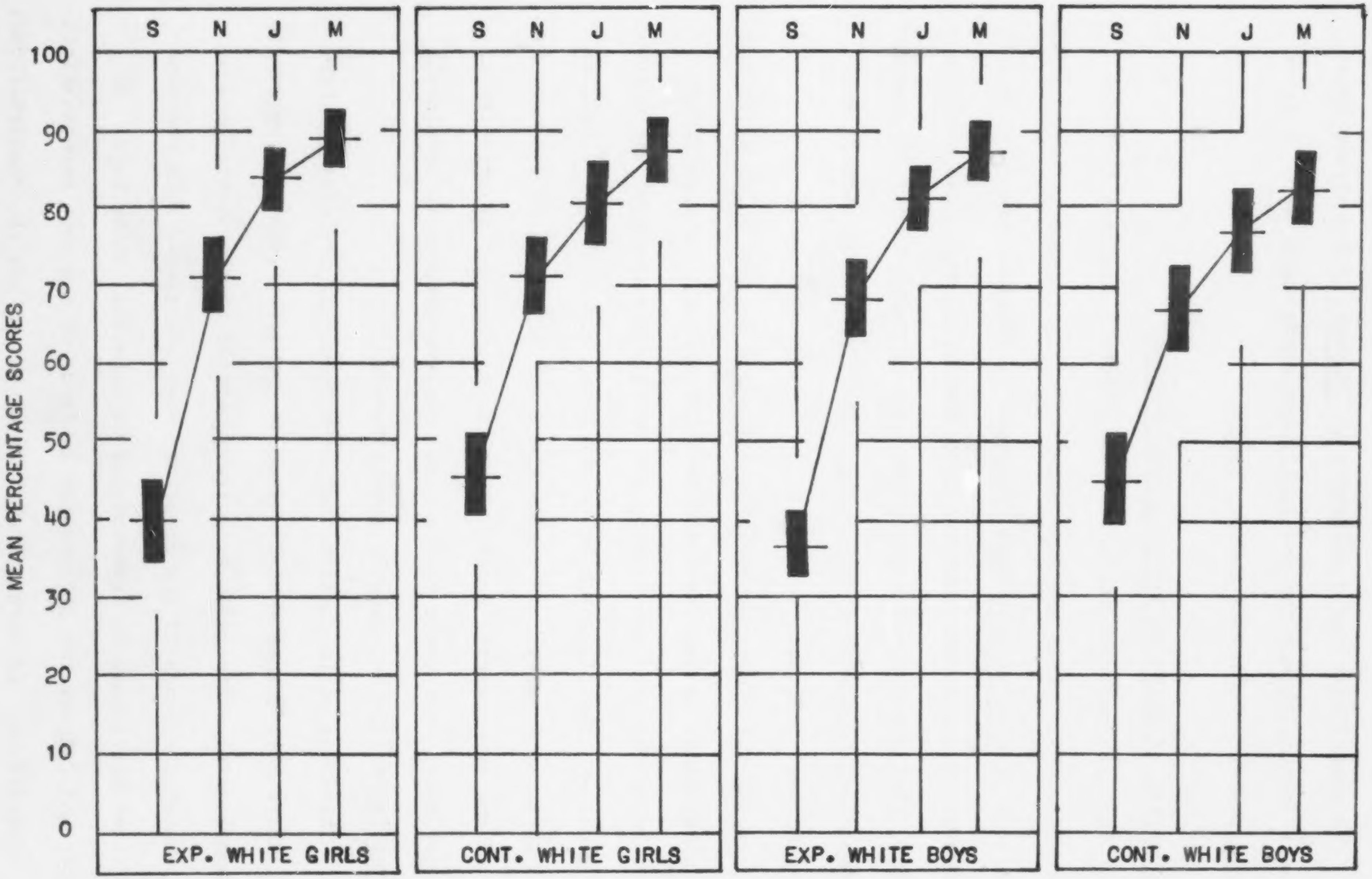


Fig. 4.--Growth curves of White subjects in Phonemes.

No significant sex differences in Phonemes under either treatment were found although the nonsignificant differences were in favor of the girls from September through March.

Growth curves of White subjects in Word Meaning

The data reported in Table 7 and Figure 5 indicate that the experimental White girls and boys made significant gains in mean percentage scores in Word Meaning from September to November and from November to January. The increase they had from January to March was not significant. The control White girls and boys had significant improvement from September to November and nonsignificant growth at each of the succeeding test periods.

While the experimental White girls and control White girls had overlapping bands in September and November with the nonsignificant difference in favor of the former, the March achievement of the control White girls was significantly below the level attained by the experimental girls in January. A similar trend was also true of the boys in favor of the experimental group. Thus the significant superiority of the experimental treatment to the basal readers program in developing Word Meaning skills was clearly demonstrated.

There was an indication that when readiness training was provided, White boys (Experimental) tended to be significantly superior to the experimental White girls at certain periods of the investigation. In September the bands of the girls and boys overlapped with the nonsignificant difference in favor of the experimental White boys. In November and January the differences in favor of the boys were statistically significant. In March, the girls caught up but the nonsignificant

TABLE 7

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN WORD MEANING FOR WHITE SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls				
Mean	44.0	55.1	69.5	73.3
σ	17.0	17.0	18.3	16.2
σ_M	1.7	1.7	1.8	1.6
95% Confidence	40.8	51.8	66.0	70.2
Interval Band	47.3	58.4	73.1	76.4
Cont. White Girls				
Mean	43.8	54.0	57.2	61.9
σ	16.1	17.4	16.7	16.4
σ_M	1.6	1.7	1.6	1.6
95% Confidence	40.7	50.6	53.9	58.7
Interval Band	46.9	57.3	60.4	65.1
Exp. White Boys				
Mean	50.1	62.9	78.2	78.7
σ	18.3	17.9	16.0	15.0
σ_M	1.7	1.7	1.5	1.4
95% Confidence	46.7	59.6	75.3	76.0
Interval Band	53.5	66.3	81.2	81.5
Cont. White Boys				
Mean	49.3	57.0	62.0	66.2
σ	19.4	18.0	16.9	16.4
σ_M	1.8	1.7	1.6	1.6
95% Confidence	45.7	53.6	58.9	63.1
Interval Band	52.9	60.3	65.1	69.2

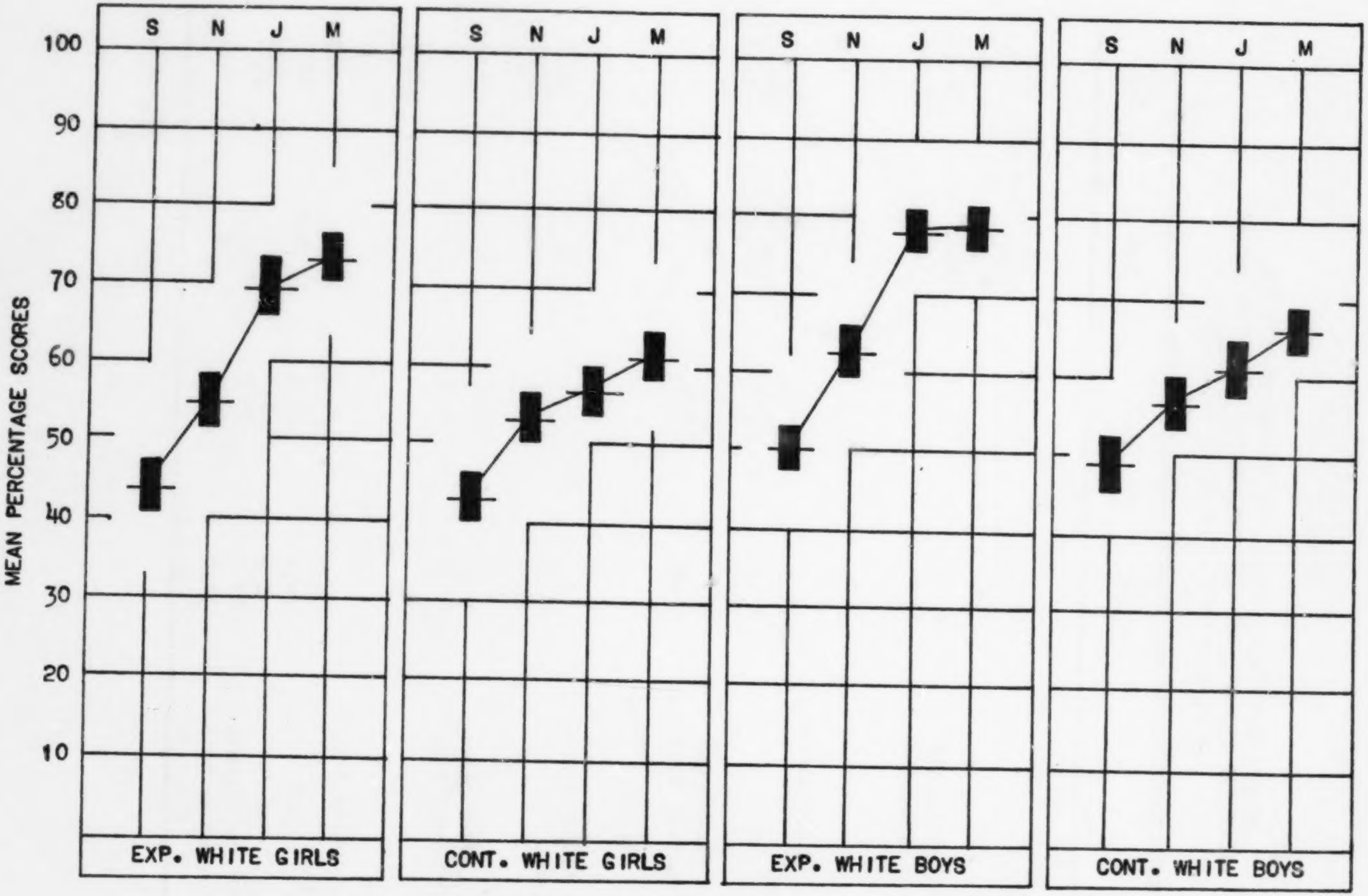


Fig. 5.--Growth curves of White subjects in Word Meaning.

difference was in favor of the boys.

With regard to the performance of the control White groups, the girls and boys had overlapping bands at all of the testing points. This revealed that when no reading readiness training was provided but there was formal reading instruction, no significant sex differences existed.

Growth curves of White subjects in Listening

As shown by the data presented in Table 8 and Figure 6, experimental White girls and boys improved steadily in Listening skills from September through March with significant mean gains occurring within the first two months of reading readiness training.

Continuous improvement from September through March was also made by the control White girls and boys. The control White girls gained significantly from September to November while the control White boys gained significantly not only from September to November but also from November to January.

Comparisons were made between the confidence bands of the experimental and of the control groups. In September the confidence bands of the experimental White groups (boys and girls) overlapped with those of the control groups (boys and girls). The nonsignificant differences in September which favored the experimental groups became statistically significant in November as well as in January. In March the control groups, both boys and girls, caught up but the nonsignificant differences were also in favor of the experimental groups. These facts showed the superiority of the experimental procedure to the control treatment in developing skills in Listening.

In the development of Listening skills under the experimental or

TABLE 8

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN LISTENING FOR WHITE SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls				
Mean	57.1	70.1	75.8	77.6
σ	16.3	14.9	13.1	13.2
σ_M	1.6	1.5	1.3	1.3
95% Confidence	54.0	67.3	73.3	75.0
Interval Band	60.2	73.0	78.3	80.1
Cont. White Girls				
Mean	54.2	64.1	69.2	74.3
σ	18.2	14.1	16.0	14.2
σ_M	1.8	1.4	1.6	1.4
95% Confidence	50.7	61.4	66.2	71.6
Interval Band	57.7	66.8	72.3	77.1
Exp. White Boys				
Mean	58.8	73.3	77.5	79.5
σ	18.0	13.7	13.3	12.9
σ_M	1.7	1.3	1.3	1.2
95% Confidence	55.4	70.7	75.0	77.1
Interval Band	62.1	75.8	79.9	81.9
Cont. White Boys				
Mean	55.5	64.3	71.8	74.8
σ	17.1	15.8	13.3	12.8
σ_M	1.6	1.5	1.3	1.2
95% Confidence	52.4	61.4	69.3	72.4
Interval Band	58.7	67.3	74.2	77.1

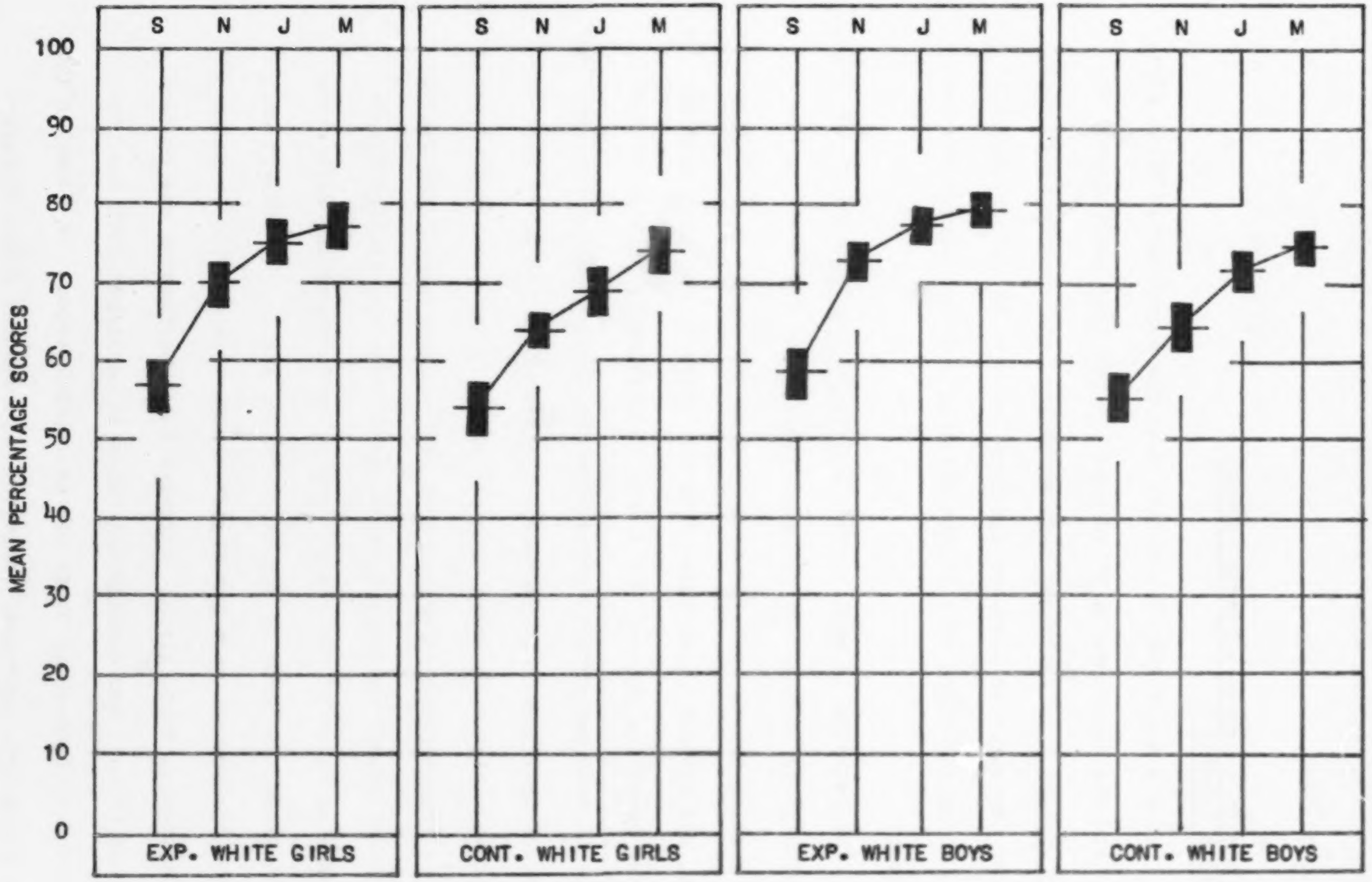


Fig. 6.--Growth curves of White subjects in Listening.

the control treatments, significant differences associated with sex were not evident.

Growth curves of White subjects (young) in Pattern Copying

Table 9 and Figure 7 indicate that the experimental White girls (young) and the experimental White boys (young) grew continuously in Pattern Copying from September through March. Significant gains were made from September to November and from November to January by both groups. From the third to the last testing, the improvement was not significant.

The increase in mean scores in Pattern Copying made by the control White girls (young) was not significant from the first to the second testing period, was significant from the second to the third testing, and was not significant from the third to the last testing. On the other hand, the control White boys (young) had a nonsignificant decrease in mean percentage scores from the first to the second testing periods, a significant increase from the second to the third testing, and a nonsignificant increase from the third to the last testing period.

Although the confidence bands of the experimental and control White girls (young) overlapped in September with the nonsignificant difference in favor of the control group, by November the difference was significant in favor of the experimental girls. In January and March the differences were not significant but were still in favor of the experimental White girls. Likewise the experimental and control White boys (young) had overlapping bands in September with the nonsignificant difference in favor of the control group. In November the control young boys decreased while the experimental group increased

TABLE 9

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PATTERN COPYING FOR WHITE SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Young				
Mean	11.8	27.2	41.8	46.0
σ	12.9	16.3	22.1	19.7
σ_M	1.7	2.2	3.0	2.7
95% Confidence	8.4	22.9	35.9	40.8
Interval Band	15.2	31.5	47.6	51.2
Cont. White Girls, Young				
Mean	16.3	18.2	31.9	36.4
σ	11.9	14.3	17.2	17.4
σ_M	1.6	1.9	2.3	2.3
95% Confidence	13.2	14.5	27.4	31.9
Interval Band	19.4	21.9	36.4	41.0
Exp. White Boys, Young				
Mean	14.1	26.8	41.9	48.1
σ	16.9	18.1	20.5	22.6
σ_M	2.5	2.7	3.1	3.4
95% Confidence	9.1	21.5	35.9	41.4
Interval Band	19.1	32.2	48.0	54.8
Cont. White Boys, Young				
Mean	16.5	14.9	30.2	36.7
σ	13.2	11.9	16.6	19.5
σ_M	1.8	1.6	2.3	2.7
95% Confidence	12.9	11.7	25.8	31.5
Interval Band	20.1	18.2	34.7	42.0

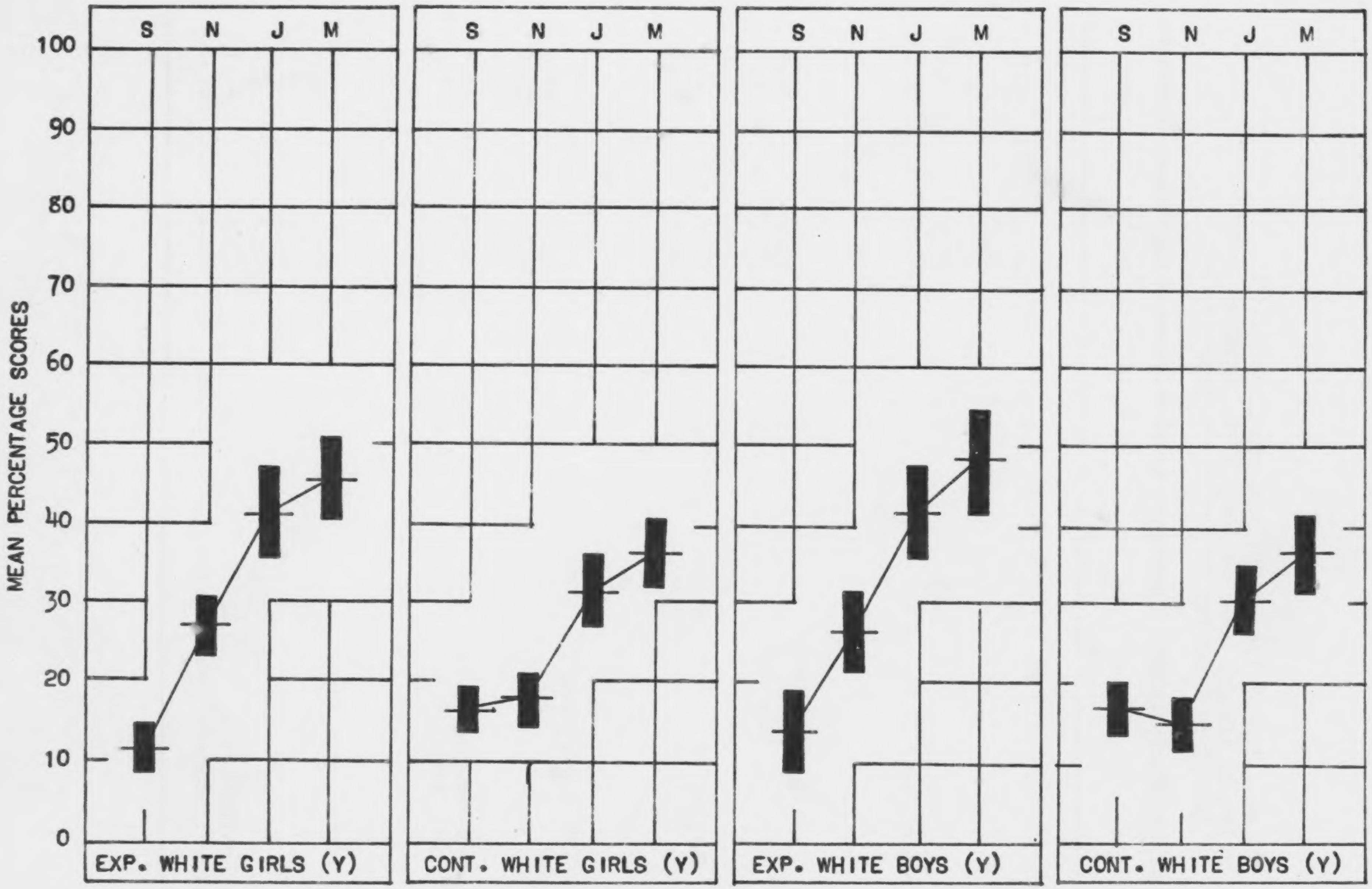


Fig. 7.--Growth curves of White subjects (young) in Pattern Copying.

giving rise to statistically significant differences in favor of the latter. In January both groups increased their mean percentage scores but the difference was still significant and still in favor of the experimental group. In March the control young boys caught up with the experimental boys, who, however held the nonsignificant advantage. Thus for young White subjects, boys and girls, the experimental treatment proved to be superior to the basal readers program in the development of Pattern Copying skills. This superiority was statistically significant within the first two months of readiness training for girls and within the first and second two months training periods for boys.

Confidence bands of girls and boys among the White young subjects under either treatment overlapped at each of the September, November, January, and March testing periods which indicated no significant differences in Pattern Copying associated with sex.

Growth curves of White subjects (young) in Identical Forms

As revealed by Table 10 and Figure 8, all the White subjects (young) made a continuous growth in Identical Forms from September through March. Significant increments every two months were made by the experimental girls and boys from September to November. Subsequent gains within two month intervals were not significant. However, the gain made within four months from November to March was significant.

A slow, nonsignificant, and almost regular amount of increase in mean scores every two months seemed to characterize the growth of the control White young girls and boys in Identical Forms. The gains made by both groups every four months from September to January and from November to March were, however, significant.

TABLE 10

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN IDENTICAL FORMS FOR WHITE SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Young				
Mean	16.9	31.8	36.4	39.7
σ	12.4	14.9	14.4	13.8
σ_M	1.7	2.0	1.9	1.9
95% Confidence	13.7	]7.9	32.6	36.1
Interval Band	20.2	35.7	40.2	43.4
Cont. White Girls, Young				
Mean	26.0	31.2	39.5	44.7
σ	12.5	11.1	20.2	16.9
σ_M	1.7	1.5	2.7	2.3
95% Confidence	22.8	28.2	34.2	40.3
Interval Band	29.3	34.1	44.8	49.1
Exp. White Boys, Young				
Mean	16.7	31.7	35.1	37.6
σ	11.2	13.3	10.9	13.6
σ_M	1.7	2.0	1.6	2.1
95% Confidence	13.4	27.8	31.9	33.6
Interval Band	20.0	35.6	38.3	41.6
Cont. White Boys, Young				
Mean	24.6	29.7	34.3	39.0
σ	13.3	10.4	14.4	14.2
σ_M	1.8	1.4	2.0	1.9
95% Confidence	21.0	26.9	30.4	35.1
Interval Band	28.2	32.5	38.2	42.8

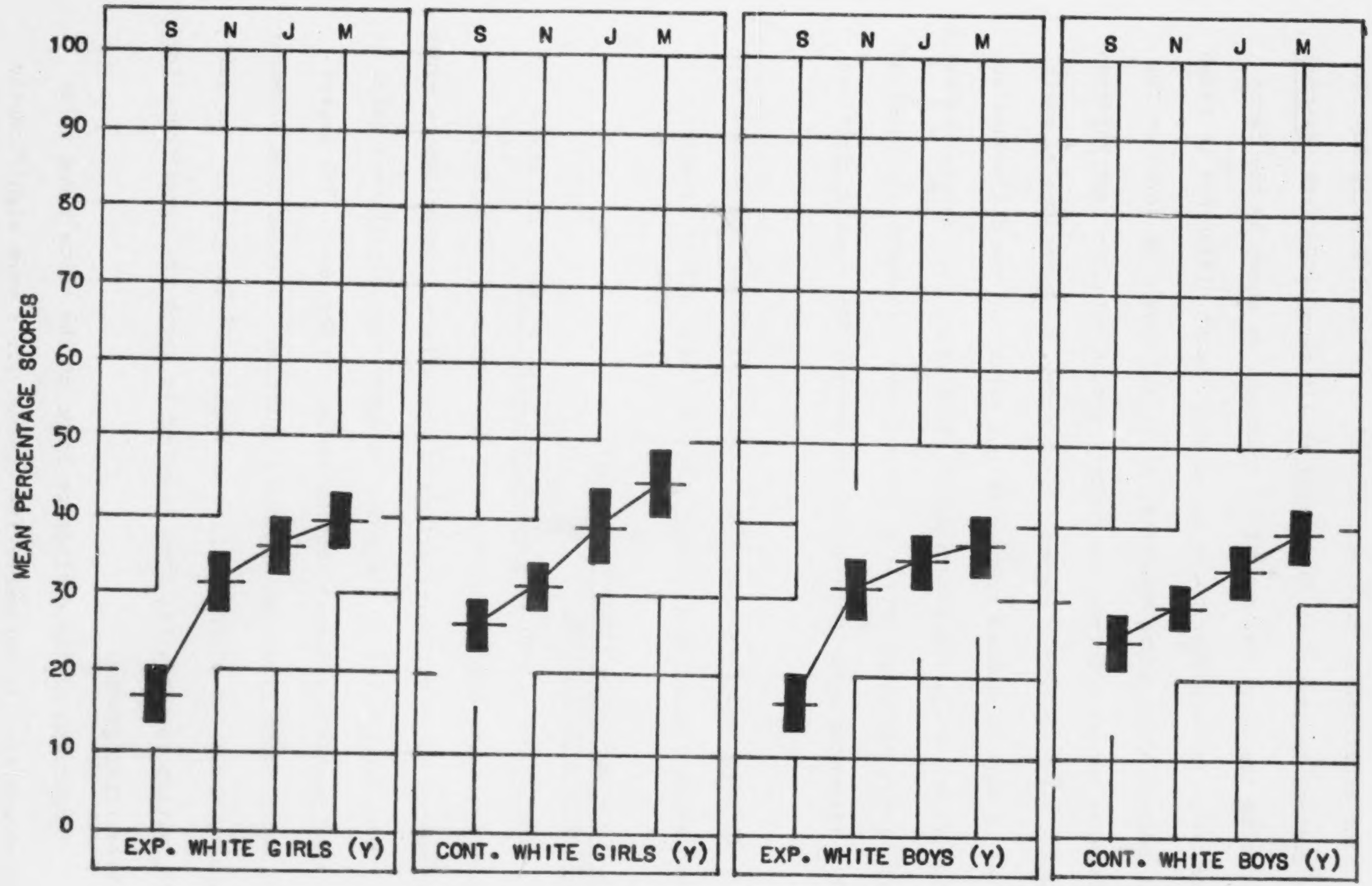


Fig. 8.--Growth curves of White subjects (young) in Identical Forms.

The experimental treatment proved to be significantly superior to the control treatment in developing skills associated with Identical Forms during the first two months of training, as shown by the facts that follow. In September there was a significant difference in favor of the control White young subjects, girls and boys. By November the experimental groups overtook the control groups with the nonsignificant difference in favor of the former. In January the experimental White young girls were surpassed by the control girls but the difference was not significant while the experimental White young boys maintained their nonsignificant advantage over the control boys. In March the nonsignificant differences were in favor of the control White young girls and boys.

In Identical Forms, no significant differences associated with sex were evident among White young subjects under either treatment.

Growth curves of White subjects (young) in Auditory Discrimination

Continuous growth in Auditory Discrimination by all White young subjects was evident in Table 11 and Figure 9. All groups (experimental White girls, experimental White boys, control White girls, and control White boys) in the young category made significant gains in their mean percentage scores from September to November. The experimental White young girls had another significant increase from November to January while the other groups made nonsignificant gains. The gain, though, within four months, from November to March was significant for the three other groups.

Comparison of the confidence bands of the White young girls' groups showed that in September the control girls were significantly

TABLE 11

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN AUDITORY DISCRIMINATION FOR WHITE SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Young				
Mean	14.9	53.3	69.9	80.8
σ	19.9	28.4	31.9	22.5
σ_M	2.7	3.8	4.3	3.0
95% Confidence	9.6	45.8	61.4	74.8
Interval Band	20.1	60.8	78.3	86.7
Cont. White Girls, Young				
Mean	31.4	62.8	70.6	82.9
σ	28.0	33.0	28.3	19.9
σ_M	3.7	4.4	3.8	2.7
95% Confidence	24.1	54.1	63.2	77.7
Interval Band	38.7	71.4	78.0	88.1
Exp. White Boys, Young				
Mean	17.4	55.2	71.4	82.1
σ	25.7	30.1	24.7	20.0
σ_M	3.9	4.5	3.7	3.0
95% Confidence	9.8	46.3	64.1	76.2
Interval Band	25.0	64.1	78.7	88.0
Cont. White Boys, Young				
Mean	20.9	52.2	63.0	73.1
σ	26.5	29.0	30.5	28.2
σ_M	3.6	4.0	4.2	3.9
95% Confidence	13.7	44.3	54.8	65.5
Interval Band	28.0	60.0	71.2	80.7

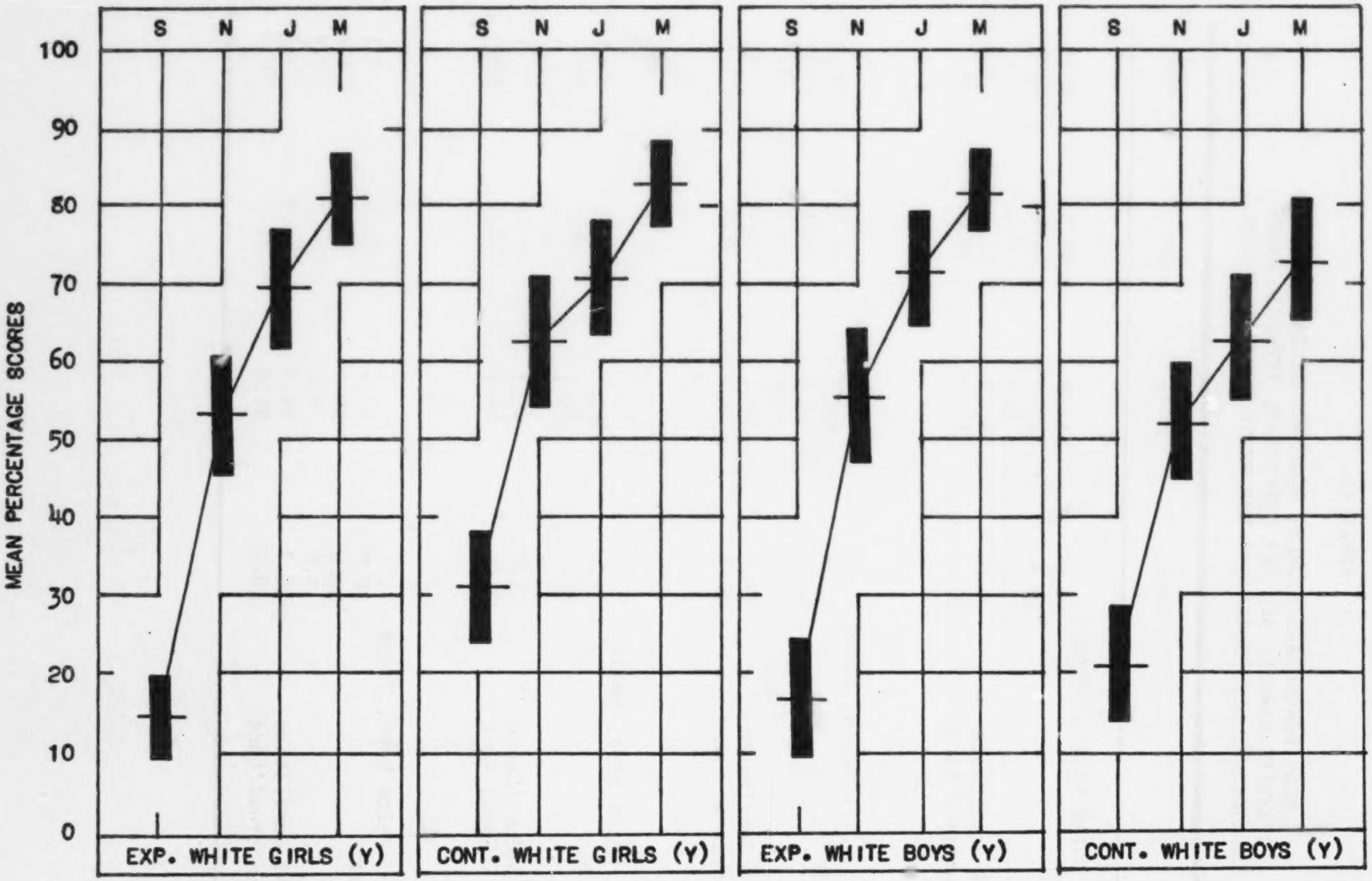


Fig. 9.--Growth curves of White subjects (young) in Auditory Discrimination.

superior to the experimental girls. But after the first two months of readiness training, the experimental White young girls surpassed the control group although the difference was not significant. At each of the testing periods from November to March the experimental group maintained their nonsignificant advantage over the control group. These facts indicate the superiority of the experimental treatment to the control treatment in the development of Auditory Discrimination among White young girls particularly during the first two months of readiness training.

For White young boys, there seemed to be no significant differences between the experimental and control treatments. However, although the September bands of the experimental and control groups overlapped with the nonsignificant difference in favor of the latter, from November through March the experimental White young boys excelled the control group but the difference was not significant.

There were no evidences of significant differences associated with sex in the development of Auditory Discrimination skills among White young subjects since the bands of girls and boys in both experimental and control groups overlapped at all of the testing points.

Growth curves of White young subjects in Phonemes

Table 12 and Figure 10 reveal that there was an uninterrupted growth in Phonemes skills by all White subjects from September through March. The mean percentage gains made by the experimental White young girls as well as boys were statistically significant at the .05 level from September to November, almost significant from November to January, and not significant from January to March.

TABLE 12

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PHONEMES FOR WHITE SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Young				
Mean	33.4	70.1	82.6	86.4
σ	23.5	25.4	22.3	22.5
σ_M	3.2	3.4	3.0	3.0
95% Confidence	27.2	63.4	76.7	80.5
Interval Band	39.7	76.8	88.5	92.4
Cont. White Girls, Young				
Mean	45.8	70.9	81.0	88.5
σ	30.3	27.7	24.7	20.3
σ_M	4.0	3.7	3.3	2.7
95% Confidence	37.9	63.6	74.5	83.2
Interval Band	53.8	78.1	87.4	93.8
Exp. White Boys, Young				
Mean	28.6	63.9	79.4	87.0
σ	23.8	28.3	24.3	17.8
σ_M	3.6	4.3	3.7	2.7
95% Confidence	21.6	55.6	72.3	81.8
Interval Band	35.6	72.3	86.6	92.3
Cont. White Boys, Young				
Mean	37.5	61.4	72.1	76.3
σ	29.4	31.5	30.6	28.6
σ_M	4.0	4.3	4.2	3.9
95% Confidence	29.6	52.9	63.9	68.6
Interval Band	45.5	69.8	80.4	84.0

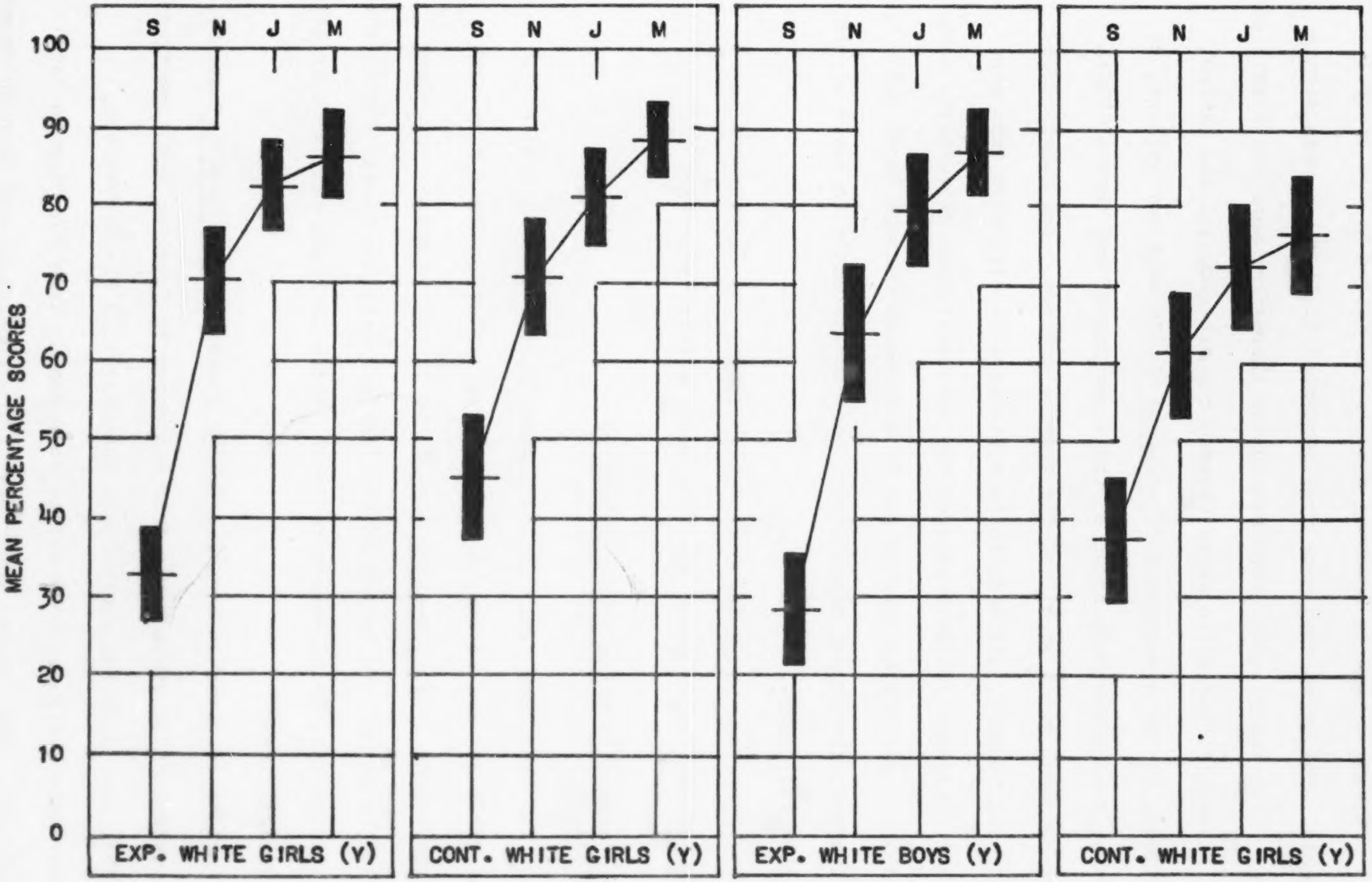


Fig. 10.--Growth curves of White subjects (young) in Phonemes.

Steady growth in Phonemes was also exhibited by the control subjects. The gains they made from September to November were significant while their gains every two months thereafter were not significant.

Significant differences between the experimental and control treatments in the development of Phonemes skills were not evident, as shown by the overlapping bands of the experimental and control White young boys and girls at all of the testing periods. The experimental treatment, however, did seem to be somewhat more effective than the control treatment for in September the nonsignificant differences were in favor of the control groups but from November through March the differences, though not significant, were consistently in favor of the experimental groups.

There were no evidences of significant sex differences in Phonemes among White young subjects under either treatment.

Growth curves of White subjects (young)
Word Meaning

As seen from Table 13 and Figure 11, the experimental White young girls as well as boys had significant gains in their mean percentage scores in Word Meaning within the first two months and also within the second two months of reading readiness training. Within the last two months, from January to March, their increase was not statistically significant.

The increase in mean percentage scores in Word Meaning made by the control White young girls from September to November was significant but that made each two months from November till March were not. Neither were the gains made within four months from November to March significant. The control young boys had a continuous and regular improve-

TABLE 13

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN WORD MEANING FOR WHITE SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Young				
Mean	41.2	54.5	68.3	71.4
σ	16.9	18.2	19.8	17.7
σ_M	2.3	2.5	2.7	2.4
95% Confidence	36.8	49.7	63.1	66.7
Interval Band	45.7	59.3	73.5	76.1
Cont. White Girls Young				
Mean	43.7	54.9	56.8	62.4
σ	15.6	17.3	14.9	17.2
σ_M	2.1	2.3	2.0	2.3
95% Confidence	39.7	50.4	52.9	57.9
Interval Band	47.8	59.4	60.7	66.9
Exp. White Boys, Young				
Mean	46.7	62.2	77.6	78.4
σ	17.1	18.8	16.0	15.6
σ_M	2.6	2.8	2.4	2.3
95% Confidence	41.7	56.7	72.8	73.8
Interval Band	51.8	67.8	82.3	83.0
Cont. White Boys, Young				
Mean	46.1	53.8	60.1	66.0
σ	19.2	17.5	15.8	15.9
σ_M	2.6	2.4	2.2	2.2
95% Confidence	40.9	49.1	55.9	61.8
Interval Band	51.3	58.5	64.4	70.3

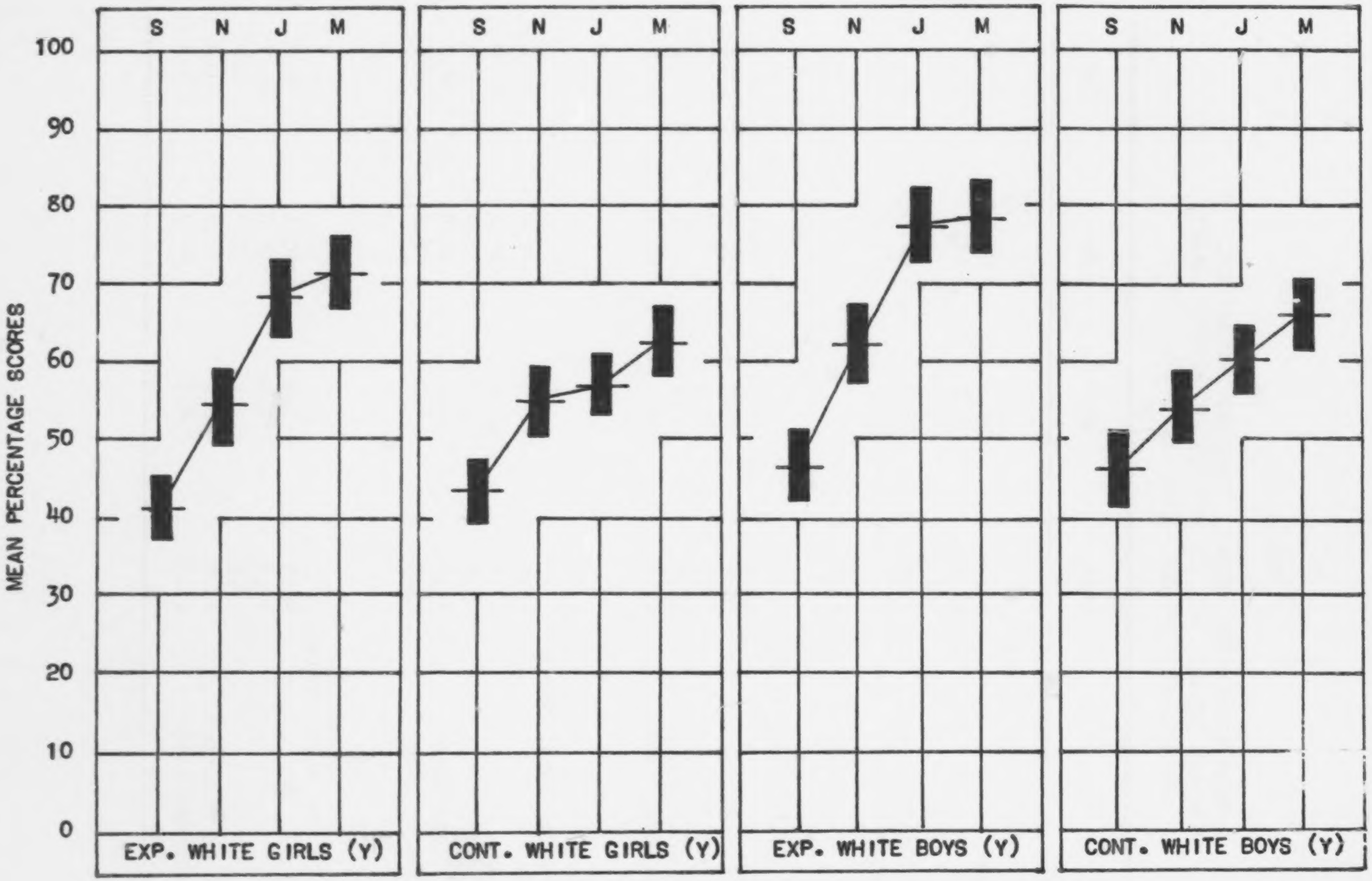


Fig. 11.--Growth curves of White subjects (young) in Word Meaning.

ment but not enough to be statistically significant within any two months interval. The gains made within four months from September to January and from November to March were, however, significant.

The experimental treatment was significantly superior to the basal readers program in the development of Word Meaning skills among White subjects particularly after four months of intensive reading readiness training. This was revealed by the fact that in September and November the nonsignificant differences were in favor of the control White young girls but in January the experimental girls group surpassed the control group to the point of statistical significance. In March the difference became nonsignificant but still in favor of the experimental group. The experimental treatment's superiority to the control treatment was also evident in the performance of the White young boys. The two groups had overlapping bands in September and November with the nonsignificant differences in favor of the experimental group. In January and March the initial nonsignificant advantage held by the experimental group became statistically significant. Up to March the control White young boys were still significantly below the level attained by the experimental group in January.

There were no evidences of significant sex differences in Word Meaning among White young subjects for girls' and boys' bands overlapped throughout the four testing periods under each treatment.

Growth curves of White subjects (young) in Listening

Table 14 and Figure 12 show that the gains in mean percentage scores in Listening made by the experimental White young girls as well as boys were significant from September to November and nonsignificant

TABLE 14

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN LISTENING FOR WHITE SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Young				
Mean	55.7	69.1	73.7	76.1
σ	17.1	15.7	14.0	14.7
σ_M	2.3	2.1	1.9	2.0
95% Confidence	51.2	65.0	70.1	72.3
Interval Band	60.2	73.2	77.4	80.0
Cont. White Girls, Young				
Mean	53.8	63.7	71.0	74.2
σ	18.9	13.1	13.5	14.6
σ_M	2.5	1.7	1.8	2.0
95% Confidence	48.8	60.3	67.5	70.4
Interval Band	58.8	67.2	74.5	78.1
Exp. White Boys, Young				
Mean	58.2	71.9	77.0	80.5
σ	16.5	13.2	13.4	11.1
σ_M	2.5	2.0	2.0	1.7
95% Confidence	53.4	68.0	73.0	77.2
Interval Band	63.1	75.8	80.9	83.8
Cont. White Boys, Young				
Mean	51.1	62.4	69.2	70.9
σ	17.4	16.3	13.0	13.2
σ_M	2.4	2.2	1.8	1.8
95% Confidence	46.4	58.0	65.7	67.3
Interval Band	55.7	66.8	72.7	74.4

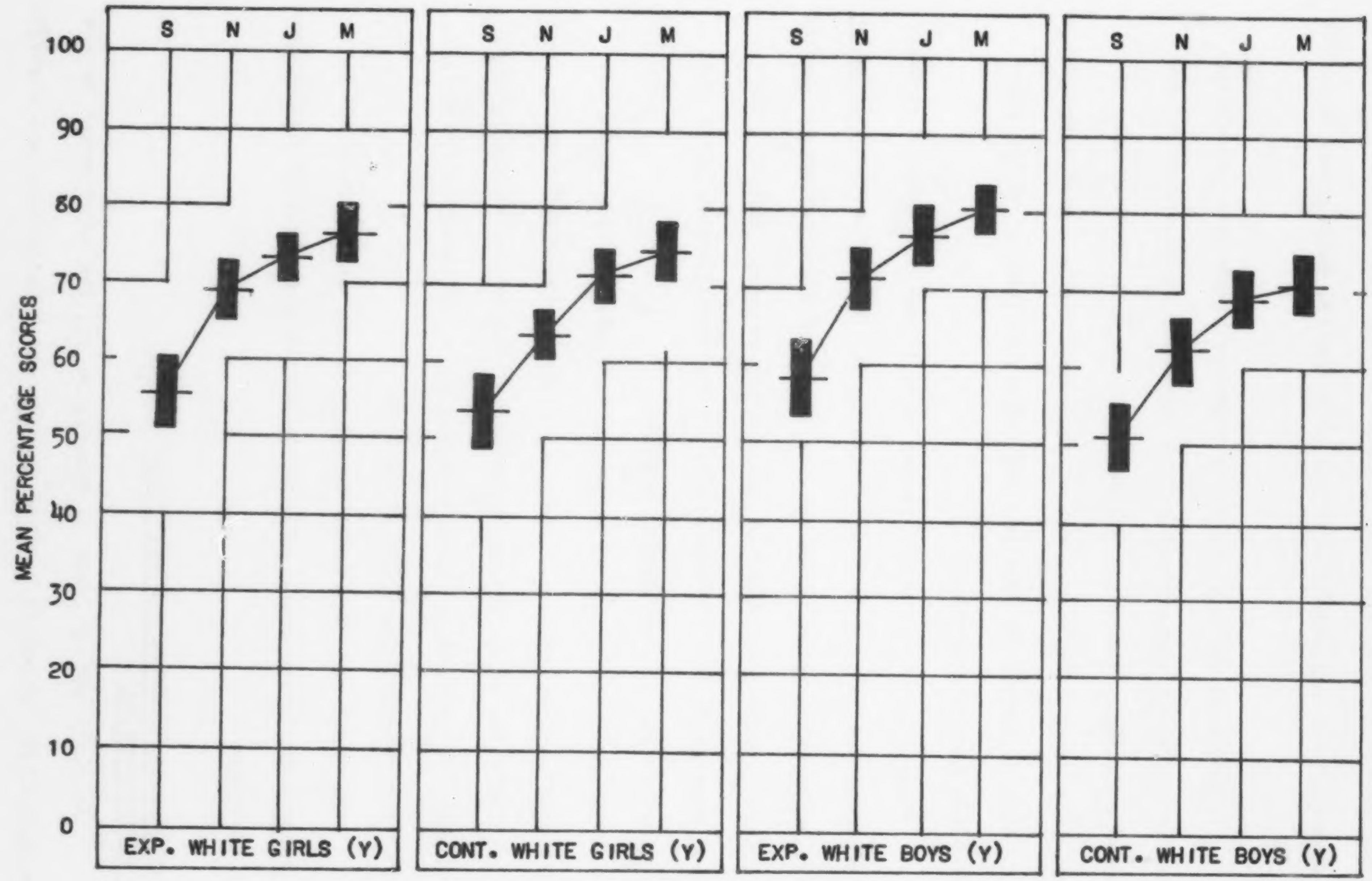


Fig. 12.--Growth curves of White subjects (young) in Listening.

each two months thereafter. The increase within four months from November to March was significant for experimental White young boys but not for girls.

The control White young girls improved their mean percentage scores in Listening significantly from September to November and from November to January then made a nonsignificant gain from January to March. The control White young boys increased their scores significantly from September to November then nonsignificantly at the succeeding two month intervals.

There did not appear to be any significant differences between the experimental and control treatments in the development of Listening skills among White young girls for the bands of the experimental and of the control groups overlapped at all testing points. However, the initial nonsignificant advantage held by the experimental girls was maintained at all of the testing periods.

On the other hand, the experimental treatment proved to be significantly superior to the control treatment among White young boys for initially the bands of the experimental and of the control groups overlapped. From November through March the significant differences favored the experimental White young boys.

There did not seem to be any significant sex differences in Listening among White young subjects under the experimental or the control treatment.

Growth curves of White subjects (old) in Pattern Copying

As disclosed by Table 15 and Figure 13, the improvement on the mean percentage scores in Pattern Copying was considerable and signifi-

TABLE 15

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PATTERN COPYING FOR WHITE SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Old				
Mean	19.3	34.6	51.5	55.0
σ	18.4	17.3	20.0	20.5
σ_M	2.6	2.5	2.9	2.9
95% Confidence	14.1	29.7	45.9	49.3
Interval Band	24.4	39.4	57.1	60.8
Cont. White Girls, Old				
Mean	19.6	21.2	29.2	36.3
σ	15.7	14.5	16.8	19.0
σ_M	2.3	2.1	2.4	2.7
95% Confidence	15.1	17.1	24.4	30.9
Interval Band	24.0	25.4	33.9	41.7
Exp. White Boys, Old				
Mean	23.9	40.7	54.1	59.6
σ	17.6	20.3	19.7	19.6
σ_M	2.1	2.5	2.4	2.4
95% Confidence	19.7	35.9	49.4	55.0
Interval Band	28.1	45.5	58.8	64.3
Cont. White Boys, Old				
Mean	21.0	21.6	34.2	41.0
σ	13.5	15.3	17.1	19.7
σ_M	1.8	2.0	2.2	2.6
95% Confidence	17.5	17.7	29.9	35.9
Interval Band	24.4	25.5	38.6	46.0

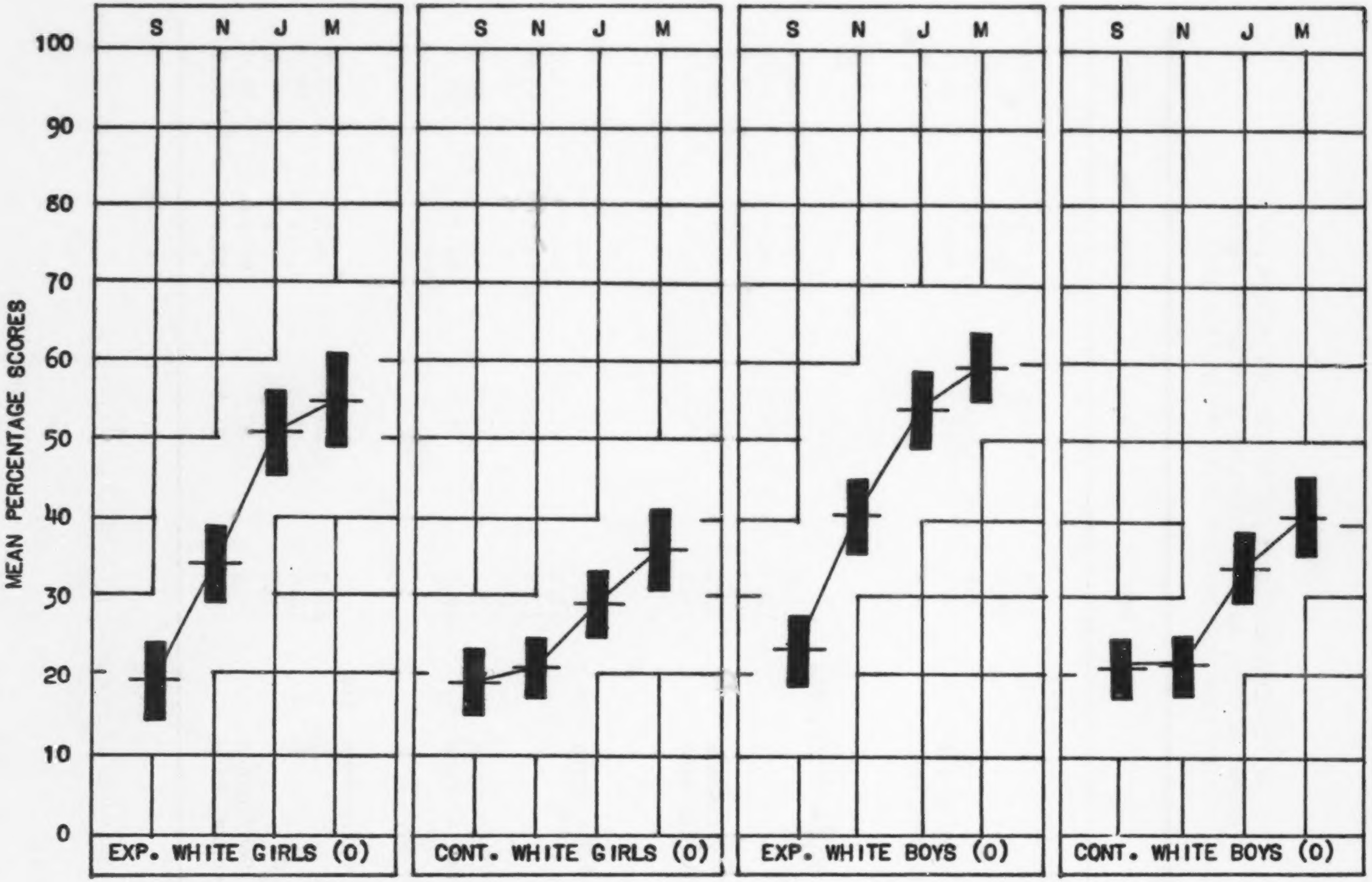


Fig. 13.--Growth curves of White subjects (old) in Pattern Copying.

cant from the first to the second testing period as well as from the second to the third testing periods but not significant within the last two month interval for experimental White old girls as well as boys.

The control White girls (old) made a gain that was nonsignificant and slight from September to November, larger but still not significant from November to January, and another nonsignificant increase from January to March. The control White old boys had an almost imperceptible and nonsignificant gain (less than 1%) from September to November, but did make a significant increase from November to January, followed by another nonsignificant gain from January to March.

The experimental treatment seemed to be most effective within the first four months of intensive readiness training. Further training seemed to result in negligible and nonsignificant gains.

The experimental treatment was significantly superior to the control treatment for the development of skills associated with Pattern Copying among White old subjects. With respect to girls, the experimental and control groups started in September with overlapping bands with the nonsignificant difference favoring the former. From November through March the experimental White old girls were consistently and significantly superior to the control group. It was only in March that the control White girls (old) reached the level attained by the experimental group in November.

A similar pattern was true of the experimental and control White boys (old) who also started in September with overlapping bands. Differences from November to March were significant and consistently in favor of the experimental group. It was also only in March that the control White boys (old) reached the level obtained by the experimental group in November in Pattern Copying.

Significant differences in Pattern Copying associated with sex were not evident among the White old subjects for girls and boys under either treatment had overlapping bands at each of the four testing periods.

Growth curves of White subjects (old) in Identical Forms

Table 16 and Figure 14 reveal that a rapid and significant gain in mean percentage scores in Identical Forms was made by the experimental White old girls within the first two months of reading readiness training. After the first two months, the improvement was so small that four months training from November to March failed to effect any significant growth.

The experimental White old boys took the first two months of reading readiness training to make an appreciable and significant gain in Identical Forms and the next four months to make another significant gain.

The control White girls (old) had nonsignificant and almost regular increments from testing to testing. They did not make any significant increase in Identical Forms within any two months period but did within four months from September to January and from November to March. The control White boys (old) made a significant mean gain in Identical Forms from September to November, an almost significant increase from November to January, and a nonsignificant reduction from January to March.

The experimental treatment was significantly superior to the basal readers program in the development of skills in Identical Forms

TABLE 16

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS,
STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS
IN IDENTICAL FORMS FOR WHITE SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Old				
Mean	21.0	36.8	40.2	44.2
σ	11.6	13.9	11.8	13.3
σ_M	1.6	2.0	1.7	1.9
95% Confidence	17.7	32.9	36.9	40.5
Interval Band	24.2	40.7	43.5	47.9
Cont. White Girls, Old				
Mean	31.5	35.5	38.1	41.2
σ	15.1	14.1	14.2	15.0
σ_M	2.2	2.0	2.1	2.2
95% Confidence	27.2	31.5	34.1	37.0
Interval Band	35.7	39.4	42.1	45.5
Exp. White Boys, Old				
Mean	20.8	33.9	37.4	45.2
σ	13.3	12.1	14.9	14.0
σ_M	1.6	1.5	1.8	1.7
95% Confidence	17.6	31.0	33.9	41.9
Interval Band	24.0	36.8	41.0	48.5
Cont. White Boys, Old				
Mean	27.5	34.1	42.2	40.9
σ	10.9	12.9	22.5	14.4
σ_M	1.4	1.7	2.9	1.9
95% Confidence	24.7	30.8	36.4	37.3
Interval Band	30.3	37.4	47.9	44.6

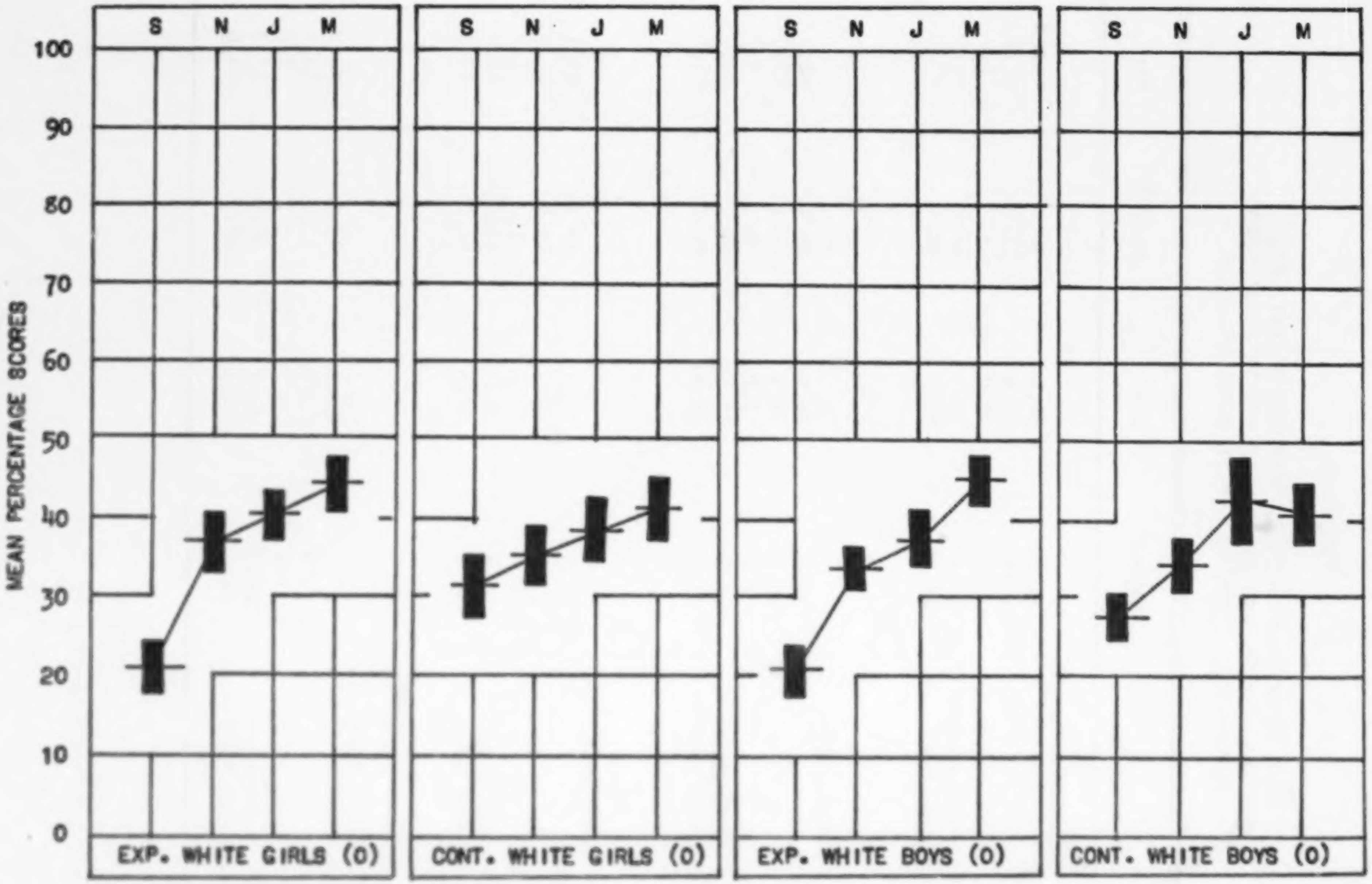


Fig. 14.--Growth curves of White subjects (old) in Identical Forms.

especially during the first two months of training in reading readiness for the experimental White girls and boys (old). This was shown by the fact that in September the control subjects, girls as well as boys, had significantly higher initial scores than the experimental subjects but from November through March the experimental White girls (old) excelled the control girls though the differences were not significant. The experimental boys also caught up in November but the control group still held the nonsignificant lead until January. In March the nonsignificant difference favored the experimental group.

There were no manifestations of significant sex differences in Identical Forms since the bands of girls and of boys (White old) under either treatment overlapped in September, November, January, and March.

Growth curves of White subjects (old) in Auditory Discrimination

Table 17 and Figure 15 indicate that the experimental White old girls as well as boys made significant improvement in Auditory Discrimination within the first two months of reading readiness instruction. The girls had nonsignificant gains from November to January and from January to March. The increase within four months time from November to March was, however, significant at the .05 level. The experimental White boys (old) also slackened their improvement to an almost significant gain from November to January, then made a second significant increase from January to March.

Significant increments in mean scores in Auditory Discrimination within the first two months of formal reading instruction were manifested by the control White old girls as well as boys. Lesser and nonsignificant improvement came about from November to January and from

TABLE 17

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN AUDITORY DISCRIMINATION FOR WHITE SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Old				
Mean	27.0	61.2	76.0	85.0
σ	28.1	32.2	24.5	21.3
σ_M	4.0	4.6	3.5	3.0
95% Confidence	19.1	52.2	69.2	79.0
Interval Band	34.9	70.3	82.9	90.9
Cont. White Girls, Old				
Mean	30.5	61.8	67.9	78.0
σ	25.6	27.1	31.3	28.5
σ_M	3.7	3.9	4.5	4.1
95% Confidence	23.3	54.2	59.1	69.9
Interval Band	37.7	69.5	76.8	86.0
Exp. White Boys, Old				
Mean	19.5	56.1	69.5	83.0
σ	21.0	31.1	28.9	21.0
σ_M	2.5	3.8	3.5	2.5
95% Confidence	14.5	48.7	62.6	78.0
Interval Band	24.5	63.5	76.3	88.0
Cont. White Boys, Old				
Mean	27.1	56.8	69.7	77.9
σ	25.1	31.6	30.6	24.6
σ_M	3.3	4.1	4.0	3.2
95% Confidence	20.6	48.7	61.9	71.6
Interval Band	33.5	64.8	77.6	84.2

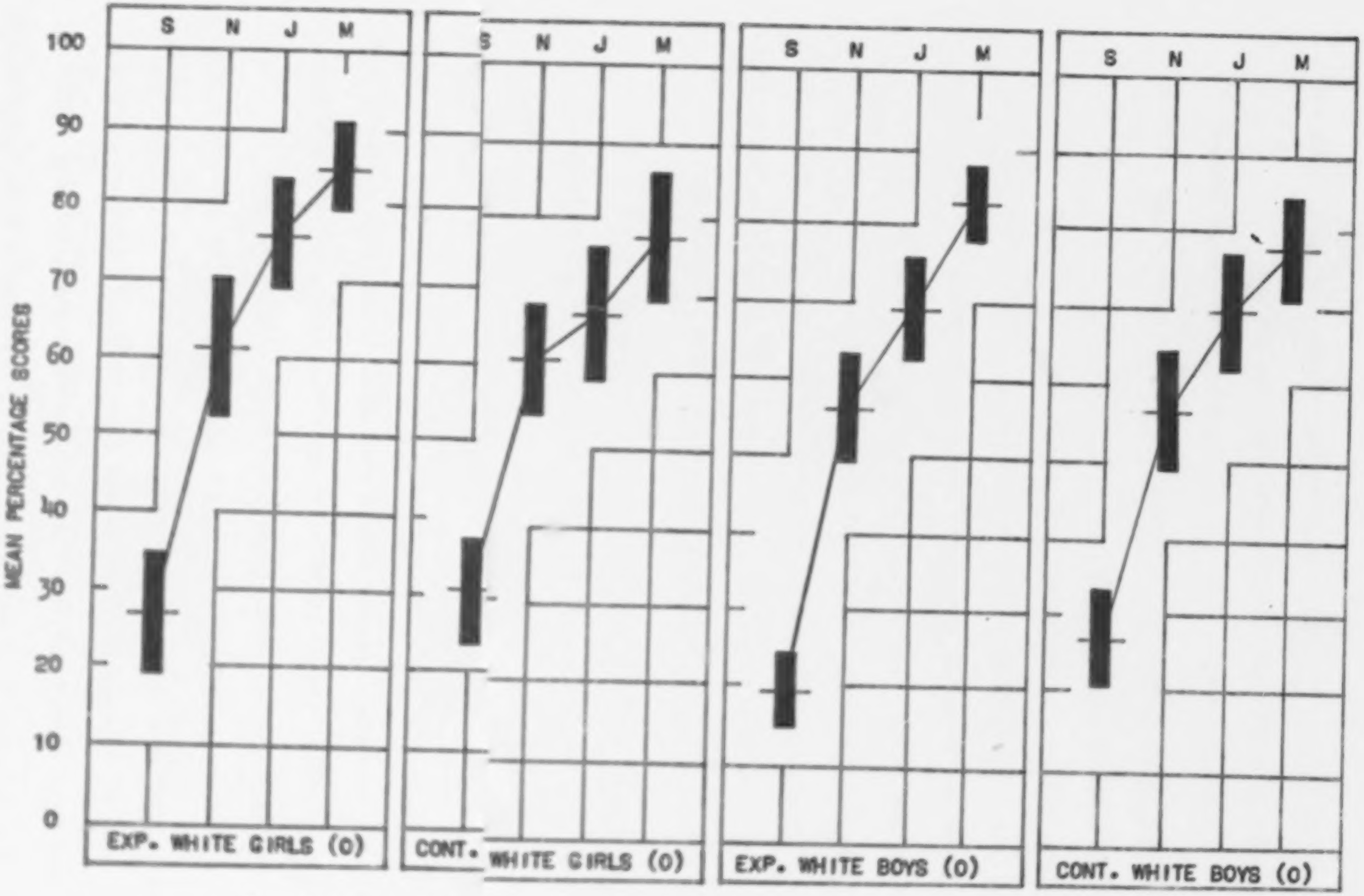


Fig. 15.--Growth curves of White subjects (old) in Auditory Discrimination.

January to March. The four month reading experience from November to March led to significant improvement for both groups.

Apparently there were no significant differences between the experimental treatment and the basal readers program in the development of Auditory Discrimination for the confidence interval bands of the four groups overlapped at each of the testing periods. The nonsignificant advantage was held by the control White girls (old) in September and November and by the experimental White girls (old) in January and March. For boys the nonsignificant differences in September and January favored the control group while the nonsignificant differences in November and March favored the experimental group.

There were no evidences of significant differences associated with sex in Auditory Discrimination among White old subjects.

Growth curves of White subjects (old) in Phonemes

The data presented in Table 18 and Figure 16 indicate a continuous growth of White old subjects in Phonemes from September through March. Gains in mean percentage scores made by the experimental White old girls and boys were rapid and significant from September to November, nearly significant from November to January, and not significant from January to March. For both groups, improvement within four months, from November to March, was significant.

The control White old girls and boys likewise had large and significant mean gains in Phonemes during the first two months of formal reading instruction then showed down to nonsignificant increases between the second and third and also between the third and fourth testing periods. The improvement within four months from November to

TABLE 18

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PHONEMES FOR WHITE SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Old				
Mean	46.2	72.2	85.2	91.5
σ	28.0	26.5	20.1	11.5
σ_M	4.0	3.8	2.9	1.6
95% Confidence	38.3	64.7	79.6	88.2
Interval Band	54.0	79.6	90.8	94.7
Cont. White Girls, Old				
Mean	45.7	71.7	79.1	86.3
σ	28.8	26.7	28.0	21.9
σ_M	4.2	3.9	4.0	3.2
95% Confidence	37.5	64.2	71.2	80.1
Interval Band	53.9	79.3	87.0	92.5
Exp. White Boys, Old				
Mean	41.7	71.3	82.7	87.7
σ	25.8	26.3	24.4	21.1
σ_M	3.1	3.2	3.0	2.6
95% Confidence	35.5	65.0	76.9	82.7
Interval Band	47.8	77.5	88.4	92.7
Cont. White Boys, Old				
Mean	52.0	72.1	81.4	88.0
σ	31.1	27.8	23.7	18.9
σ_M	4.0	3.6	3.1	2.5
95% Confidence	44.1	65.0	75.3	83.2
Interval Band	59.9	79.2	87.4	92.9

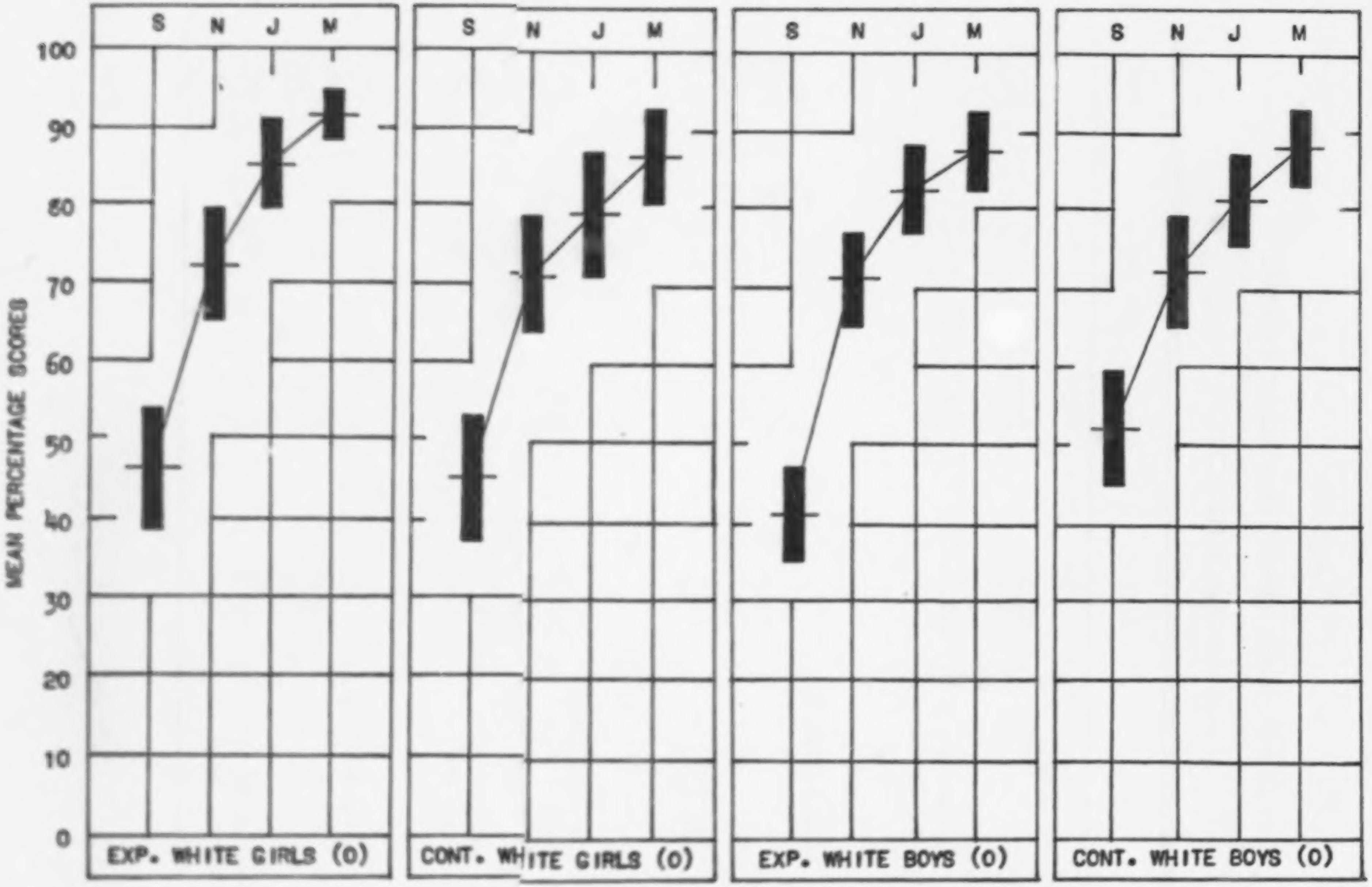


Fig. 16.--Growth curves of White subjects (old) in Phonemes.

March was significant.

There did not seem to be significant differences between the experimental and control treatments in the development of skills associated with Phonemes for the four groups had overlapping bands at all testing points. The slight and nonsignificant advantage in September was held and maintained through March by the experimental White old girls. The experimental White old boys excelled the control group only in November, and their superiority was not significant.

There was no evidence of significant sex differences in Phonemes among White old subjects.

Growth curves of White subjects (old) in Word Meaning

Table 19 and Figure 17 reveal that it took the experimental White girls (old) four months, from September to January, to make a significant improvement in Word Meaning after which they had a nonsignificant gain from January to March. The experimental White boys (old) showed greater productivity from reading readiness training by making significant increases in their mean scores not only from September to November but also from November to January after which they had an imperceptible and nonsignificant gain from January to March.

Small and nonsignificant increases every two months were obtained by the control White old girls and boys. The first four months of formal reading instruction did yield significant gains for both groups but the four months period from November to March failed to produce a significant gain.

The experimental treatment was significantly superior to the typical basal readers program in the development of Word Meaning skills

TABLE 19

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN WORD MEANING FOR WHITE SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Old				
Mean	47.2	55.7	70.9	75.4
σ	16.7	15.8	16.6	14.1
σ_M	2.4	2.3	2.4	2.0
95% Confidence	42.5	51.3	66.3	71.4
Interval Band	51.9	60.2	75.6	79.3
Cont. White Girls, Old				
Mean	43.9	52.9	57.6	61.3
σ	16.9	17.5	18.8	15.7
σ_M	2.4	2.5	2.7	2.3
95% Confidence	39.1	47.9	52.2	56.9
Interval Band	48.7	57.8	62.9	65.8
Exp. White Boys, Old				
Mean	52.3	63.4	78.7	79.0
σ	18.8	17.4	16.2	14.8
σ_M	2.3	2.1	2.0	1.8
95% Confidence	47.8	59.3	74.8	75.4
Interval Band	56.8	67.6	82.5	82.5
Cont. White Boys, Old				
Mean	52.2	59.9	63.7	66.3
σ	19.3	18.0	17.8	17.0
σ_M	2.5	2.3	2.3	2.2
95% Confidence	47.3	55.3	59.1	62.0
Interval Band	57.1	64.4	68.2	70.7

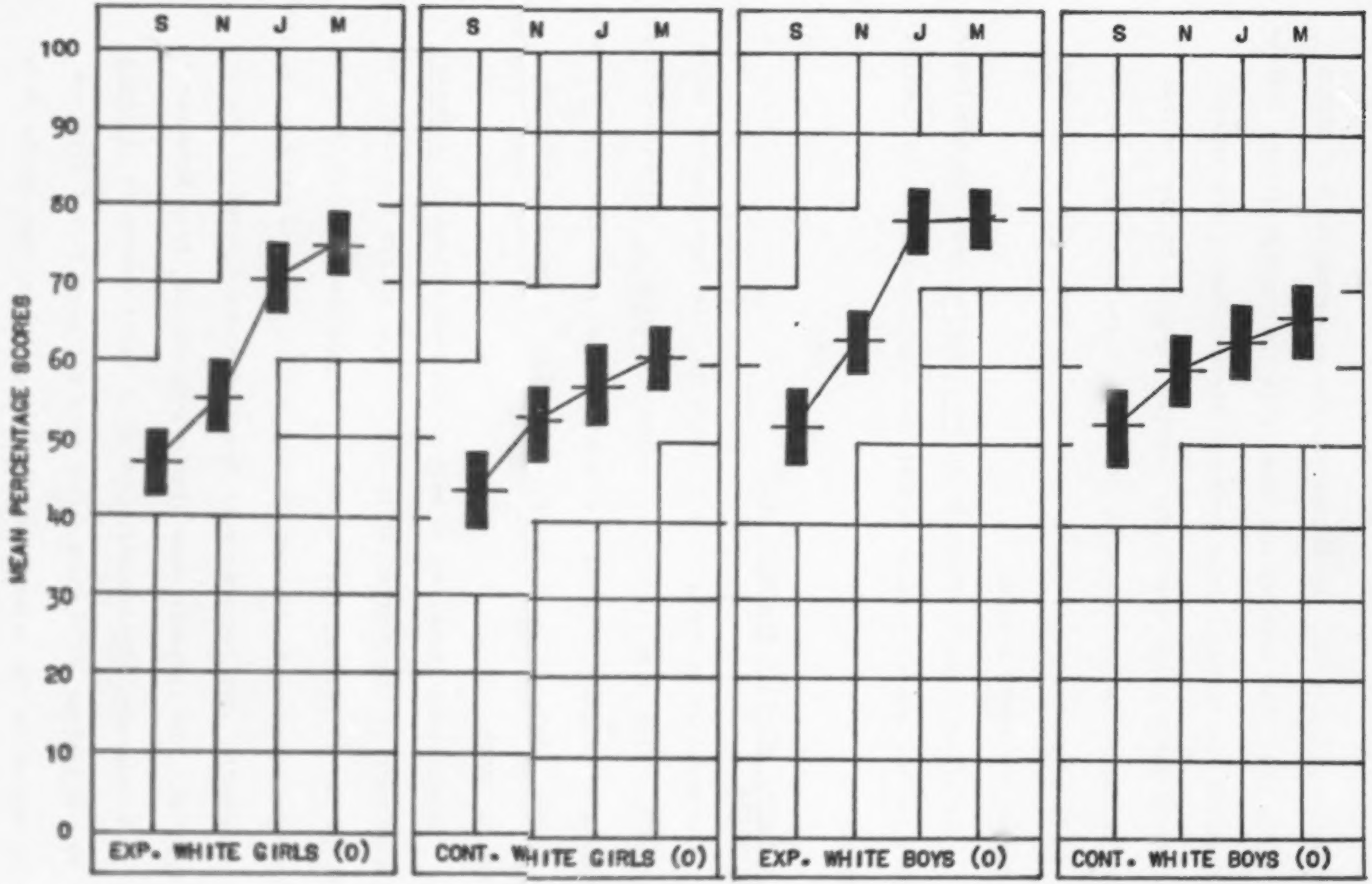


Fig. 17.--Growth curves of White subjects (old) in Word Meaning.

among White old subjects. In September, the experimental and control White girls (old) had overlapping bands with the nonsignificant difference favoring the former. From November through March, the experimental White girls (old) were significantly superior to the control group. In March the control group was still significantly below the level achieved by the experimental girls in January. The same trend was true of the boys' groups.

Significant sex differences in Word Meaning were not manifested by the White old subjects under either the experimental or the control treatment.

Growth curves of White subjects (old) in Listening

As revealed by Table 20 and Figure 18, the experimental White old girls and boys made significant gains in Listening within the first two months of reading readiness instruction then gradually slowed down to make nonsignificant increases from November to January and from January to March.

Significant increases in mean percentage scores in Listening were also made by the control White girls (old) within the first two months of formal reading instruction. The gain made within the next two months from November to January was not significant and neither was that made within the last two months of formal reading covered in the investigation. The increase made within four months, from November to March, was however, significant. Gains in means scores in Listening made by the control White boys (old) were not significant from one testing period to the other. The increases within four months from September to January and from November to March were significant.

TABLE 20

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN LISTENING FOR WHITE SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. White Girls, Old				
Mean	58.7	71.3	78.1	79.2
σ	15.5	14.1	11.8	11.2
σ_M	2.2	2.0	1.7	1.6
95% Confidence	54.3	67.4	74.8	76.1
Interval Band	63.0	75.2	81.4	82.4
Cont. White Girls, Old				
Mean	54.7	64.6	67.2	74.5
σ	17.5	15.4	18.4	13.9
σ_M	2.5	2.2	2.7	2.0
95% Confidence	49.7	60.2	62.0	70.6
Interval Band	59.6	68.9	72.4	78.4
Exp. White Boys, Old				
Mean	59.1	74.2	77.8	78.8
σ	19.1	14.0	13.4	14.0
σ_M	2.3	1.7	1.6	1.7
95% Confidence	54.6	70.8	74.6	75.4
Interval Band	63.6	77.5	80.9	82.1
Cont. White Boys, Old				
Mean	59.5	66.1	74.0	78.3
σ	16.0	15.3	13.4	11.5
σ_M	2.1	2.0	1.7	1.5
95% Confidence	55.4	62.2	70.6	75.4
Interval Band	63.6	70.0	77.5	81.2

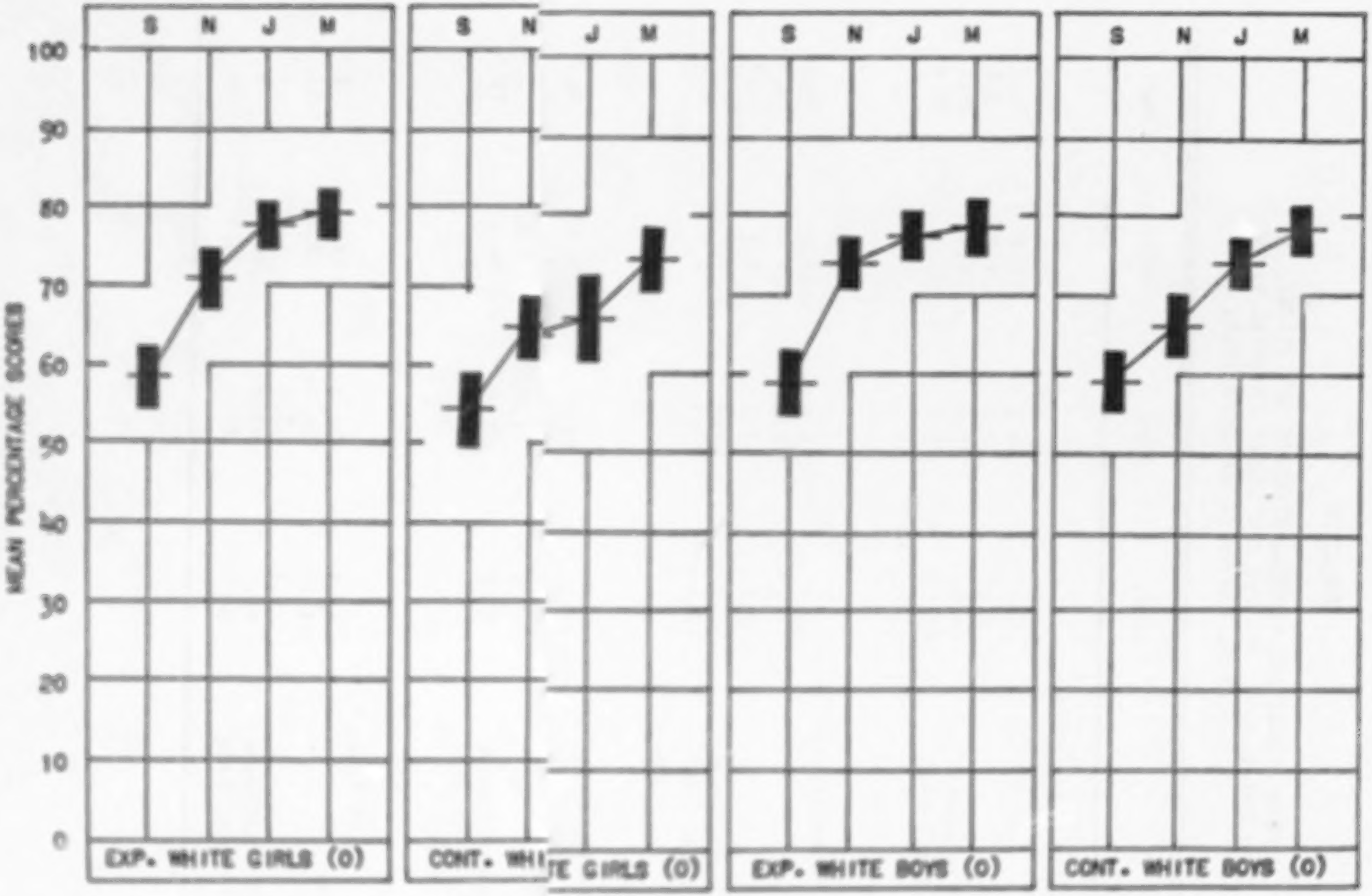


Fig. 18.--Growth curves of White subjects (old) in Listening.

The experimental treatment was significantly superior to the basal readers program in developing Listening skills at certain periods of the investigation. In September the four groups started with overlapping bands with the slight and nonsignificant differences in favor of the experimental groups. After four months of reading readiness training, the experimental White girls (old) excelled the control group and the difference was significant at the .05 level. In March the difference was no longer significant but it was still in favor of the experimental group. The experimental White boys (old) surpassed the control group at a .05 level of significance in November. This difference became nonsignificant in January and in March but still in favor of the experimental group.

There were no evidences of significant sex differences in Listening among White old subjects under either the experimental or control treatment.

Growth curves of Negro subjects in Pattern Copying

Table 21 and Figure 19 indicate that the experimental Negro girls grew continuously in Pattern Copying from September through March with significant increases in mean percentage scores occurring within every two months of reading readiness instruction. The experimental Negro boys also grew steadily in Pattern Copying from September through March with significant gains from September to November and from November to January.

Continuous growth in Pattern Copying from September to March was also exhibited by the control Negro girls and boys. But it took each of these groups four months of formal reading instruction to make

TABLE 21

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PATTERN COPYING FOR NEGRO SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls				
Mean	7.5	20.0	31.1	38.9
σ	8.9	15.2	17.5	18.9
σ_M	.9	1.5	1.8	1.9
95% Confidence	5.7	17.0	27.7	35.1
Interval Band	9.2	23.0	34.6	42.6
Cont. Negro Girls				
Mean	8.7	10.2	17.9	23.4
σ	9.1	10.1	14.3	16.5
σ_M	.9	1.0	1.4	1.7
95% Confidence	6.9	8.2	15.0	20.1
Interval Band	10.5	12.2	20.7	26.7
Exp. Negro Boys				
Mean	7.7	22.0	32.0	38.8
σ	10.2	16.2	19.8	21.5
σ_M	1.1	1.7	2.1	2.2
95% Confidence	5.6	18.8	28.0	34.4
Interval Band	9.8	25.3	36.0	43.1
Cont. Negro Boys				
Mean	8.2	9.9	17.4	21.1
σ	9.1	9.3	13.1	13.9
σ_M	.9	1.0	1.4	1.4
95% Confidence	6.4	8.0	14.8	18.2
Interval Band	10.1	11.8	20.1	23.9

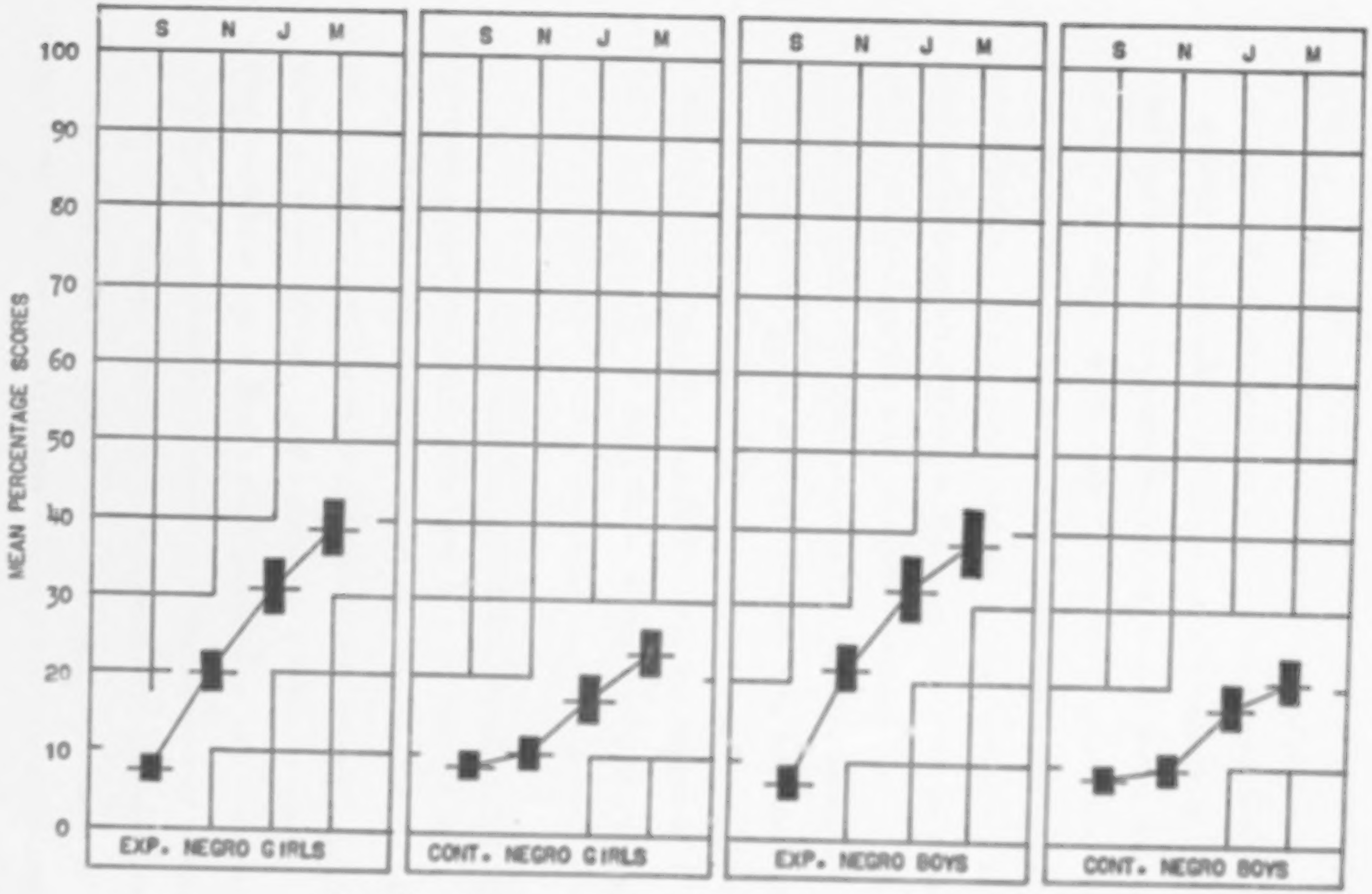


Fig. 19.--Growth curves of Negro subjects in Pattern Copying.

a significant gain from September to January.

The experimental treatment was significantly superior to the basal readers program in developing skills associated with Pattern Copying. Initially the experimental and control Negro girls were practically at the same stage of performance with the nonsignificant difference in favor of the control Negro girls. While the experimental Negro girls made significant growth at each of the four testing points, it took the control Negro girls four months to make a significant gain and until March to reach the level attained by the experimental group in November. The control Negro boys who held the nonsignificant advantage over the experimental boys in September took four months to make their first significant gain and until March to get to the stage achieved by the experimental Negro boys in November.

No significant sex differences in Pattern Copying appeared among Negro subjects inasmuch as the bands of the girls and of the boys under either treatment overlapped at each of the testing periods.

Growth curves of Negro subjects in Identical Forms

As shown by Table 22 and Figure 20 the experimental Negro girls gained significantly at the .05 level in their mean percentage scores in Identical Forms from September to November and from November to January. The increase made within the January-March interval was small and not significant. The experimental Negro boys also grew significantly from September to November and from November to January but decreased in mean scores slightly and nonsignificantly from January to March.

Within the first two months of formal reading instruction the control Negro girls and boys made significant growth but then fluctuated

TABLE 22

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN IDENTICAL FORMS FOR NEGRO SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls				
Mean	19.0	30.4	41.6	42.0
σ	19.1	13.7	13.5	16.8
σ_M	1.9	1.4	1.4	1.7
95% Confidence	15.2	27.7	38.9	38.7
Interval Band	22.7	33.1	44.3	45.3
Cont. Negro Girls				
Mean	25.5	45.1	44.0	46.2
σ	22.2	25.1	25.1	24.2
σ_M	2.2	2.5	2.5	2.4
95% Confidence	21.1	40.1	39.0	41.4
Interval Band	29.8	50.0	48.9	50.9
Exp. Negro Boys				
Mean	12.6	24.3	36.1	35.8
σ	13.6	13.4	14.3	14.0
σ_M	1.4	1.4	1.5	1.5
95% Confidence	9.8	21.6	33.2	32.9
Interval Band	15.4	27.0	39.0	38.6
Cont. Negro Boys				
Mean	24.0	37.1	35.0	39.0
σ	23.6	25.1	24.0	24.1
σ_M	2.4	2.6	2.5	2.5
95% Confidence	19.3	32.0	30.1	34.1
Interval Band	28.8	42.2	39.9	43.9

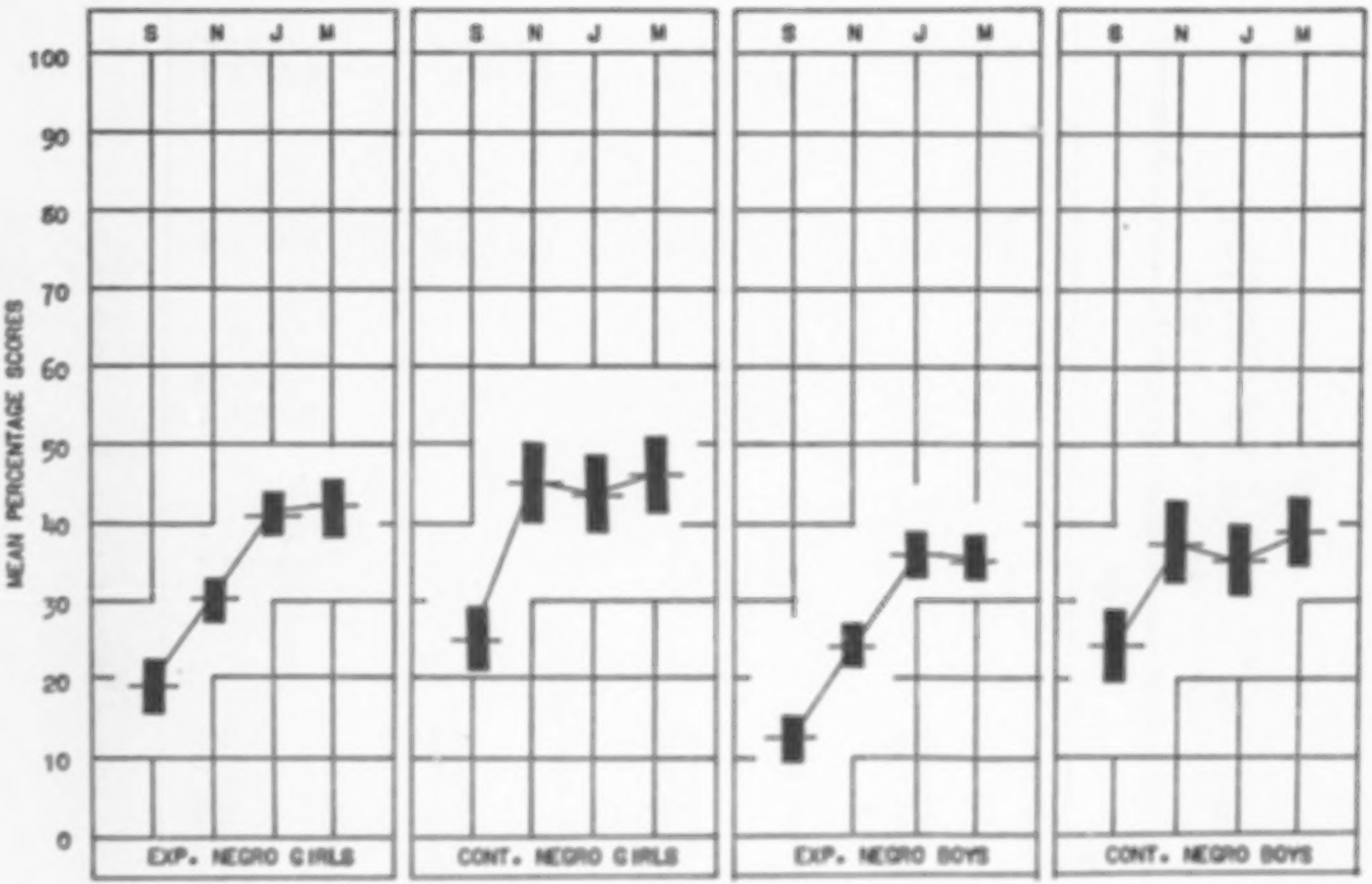


Fig. 20.--Growth curves of Negro subjects in Identical Forms.

nonsignificantly down from November to January and nonsignificantly up from January to March.

At certain stages of the investigation, the control treatment appeared to be significantly superior to the experimental treatment among girls but vice versa among boys. In September the experimental and control Negro girls had overlapping bands and the nonsignificant difference favored the latter, which difference reached statistical significance in November. The experimental Negro girls caught up with the control group in January but the nonsignificant difference favored the latter who maintained it in March. Among boys, the experimental group started with a significantly lower band than the control Negro boys' group. In fact it was only in November that the former could reach the stage where the latter were in September. From November to January the experimental Negro boys gained significantly in their mean score and this time surpassed, but not significantly, the control group who were set back by nonsignificant reduction in scores. In March the control Negro boys regained their lead over the experimental Negro group, though the difference was not statistically significant.

It was shown that mean scores in Identical Forms increased rapidly and steadily within the first four months of intensive reading readiness training after which they fluctuated nonsignificantly up for girls and nonsignificantly down for boys. Under the control treatment there was a rapid and significant improvement within the first two months of formal reading instruction after which the mean scores fluctuated nonsignificantly up and down.

When intensive reading readiness training was provided, there seemed to be a significant advantage of the Negro girls over boys as shown by the fact that the experimental Negro girls' and boys' bands overlapped in September with the nonsignificant difference favoring the former and this difference became significant in November and January in favor of the girls.

Under the control treatment there were no significant sex differences in Identical Forms among Negro subjects.

Growth curves of Negro subjects in Auditory Discrimination

The experimental Negro girls and boys grew steadily in Auditory Discrimination from September through March as indicated by Table 23 and Figure 21. Significant increases in their mean percentage scores occurred from September to November and from November to January. The gain from January to March was not significant for both groups.

Significant gains in Auditory Discrimination from September to November and from November to January were also made by control Negro girls. Their gain from January to March was not significant. The control Negro boys had a continuous growth from September through March but their gain was significant only from September to November.

Among Negro girls there were nonsignificant differences between the experimental and control treatments. From September through March the bands of the two groups overlapped. The experimental Negro girls did maintain their initial nonsignificant lead throughout the four testing periods. Among boys the experimental treatment was superior to the basal readers program as shown by the fact that in September and November the bands of the experimental and control Negro boys overlapped with the nonsignificant difference in favor of the former but in January and March the experimental Negro boys surpassed the control group with

TABLE 23

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN AUDITORY DISCRIMINATION FOR NEGRO SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls				
Mean	19.7	44.0	60.9	69.3
σ	21.7	32.0	31.0	30.5
σ_M	2.2	3.2	3.1	3.1
95% Confidence	15.4	37.7	54.8	63.3
Interval Band	24.0	50.3	67.0	75.3
Cont. Negro Girls				
Mean	19.4	39.8	52.5	59.2
σ	21.4	29.6	33.1	29.0
σ_M	2.1	3.0	3.3	2.9
95% Confidence	15.2	33.9	45.9	53.5
Interval Band	23.6	45.6	59.0	64.9
Exp. Negro Boys				
Mean	16.2	34.3	54.3	63.1
σ	19.9	27.9	32.1	29.1
σ_M	2.1	2.9	3.3	3.0
95% Confidence	12.2	28.7	47.7	57.2
Interval Band	20.2	40.0	60.8	69.0
Cont. Negro Boys				
Mean	16.0	26.8	39.1	45.5
σ	20.2	28.7	31.9	29.7
σ_M	2.1	3.0	3.3	3.1
95% Confidence	11.9	21.0	32.6	39.4
Interval Band	20.1	32.6	45.6	51.5

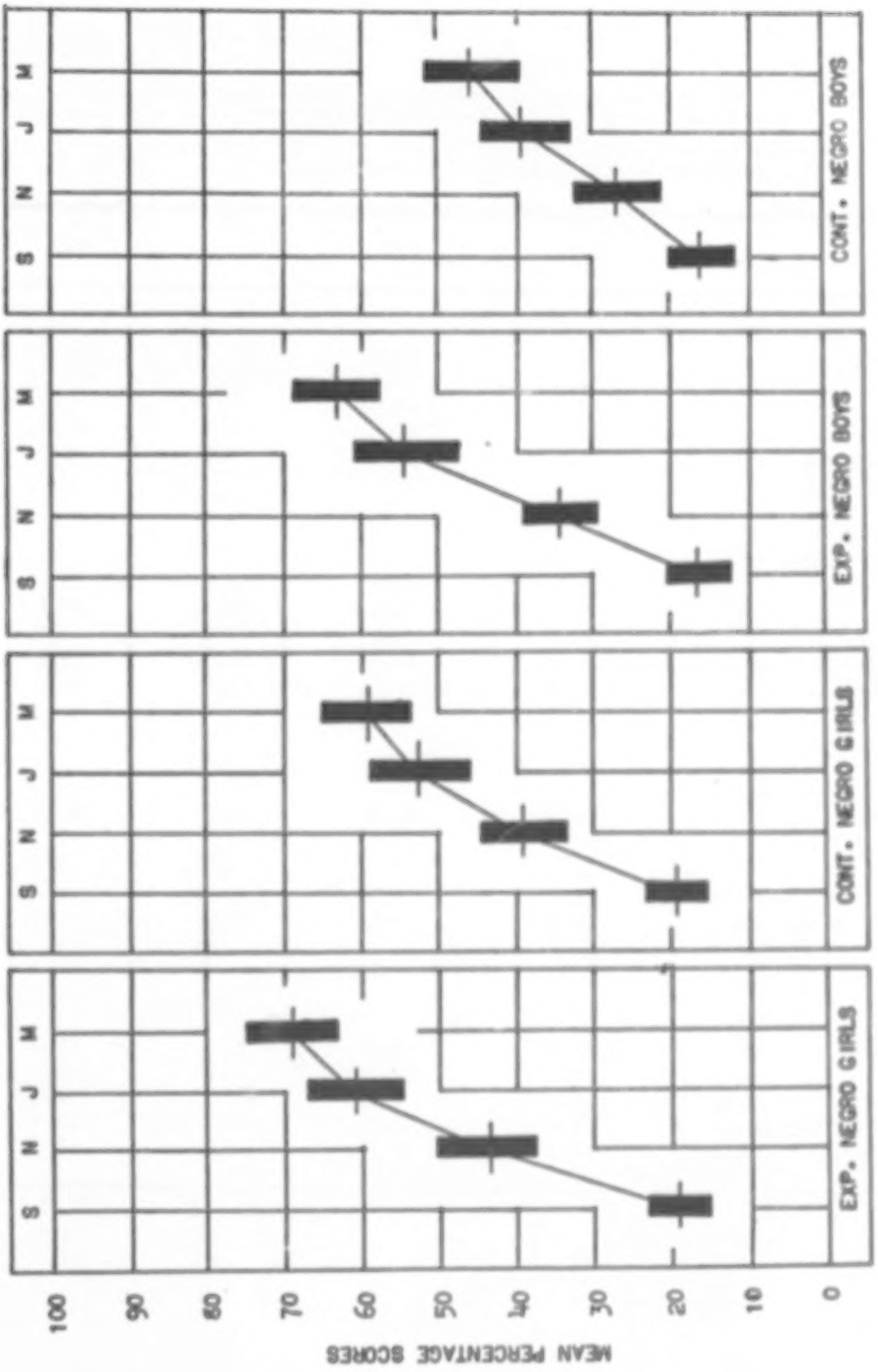


Fig. 21.--Growth curves of Negro subjects in Auditory Discrimination.

statistically significant differences.

When intensive and specific reading readiness training was provided there were no significant sex differences in Auditory Discrimination among the experimental Negro subjects. But when there was no intensive training, there were significant differences in favor of the control Negro girls. This point was proved by the fact that although the nonsignificant difference in September was in favor of the girls, this difference was statistically significant in November, January, and March and still in favor of the Negro girls.

Growth curves of Negro subjects in Phonemes

As shown by the data presented in Table 24 and Figure 22, the experimental Negro girls and boys grew steadily in Phonemes throughout the experimental period. The gains they made from September to November and from November to January were significant but that from January to March was not.

Continuous growth in Phonemes from September to March was also made by the control Negro girls with significant gains made after the pattern of the experimental Negro subjects. Growth in Phonemes was also continuous for the control Negro boys but they had a significant increase only from September to November.

Although the control Negro girls had slightly and not significantly higher mean scores than the experimental girls in September and although the latter took the nonsignificant lead in November and maintained it through March, the bands of the two groups overlapped at all of the four testing periods which indicated no significant differences between the experimental and control treatments in the development of

TABLE 24

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PHONEMES FOR NEGRO SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls				
Mean	25.2	52.9	67.2	77.1
σ	21.7	33.5	33.1	29.4
σ_M	2.2	3.4	3.3	3.0
95% Confidence	20.9	46.3	60.7	71.4
Interval Band	29.4	59.5	73.7	82.9
Cont. Negro Girls				
Mean	28.1	50.7	66.6	75.2
σ	21.5	30.9	28.6	26.0
σ_M	2.2	3.1	2.9	2.6
95% Confidence	23.8	44.7	61.0	70.1
Interval Band	32.3	56.8	72.3	80.3
Exp. Negro Boys				
Mean	19.0	39.9	58.9	67.7
σ	19.8	33.5	32.5	33.1
σ_M	2.1	3.5	3.4	3.4
95% Confidence	15.0	33.1	52.3	61.0
Interval Band	23.0	46.7	65.5	74.4
Cont. Negro Boys				
Mean	22.2	32.9	42.0	52.1
σ	18.8	29.1	31.2	31.5
σ_M	1.9	3.0	3.2	3.3
95% Confidence	18.4	27.0	35.7	45.6
Interval Band	26.0	38.8	48.4	58.5

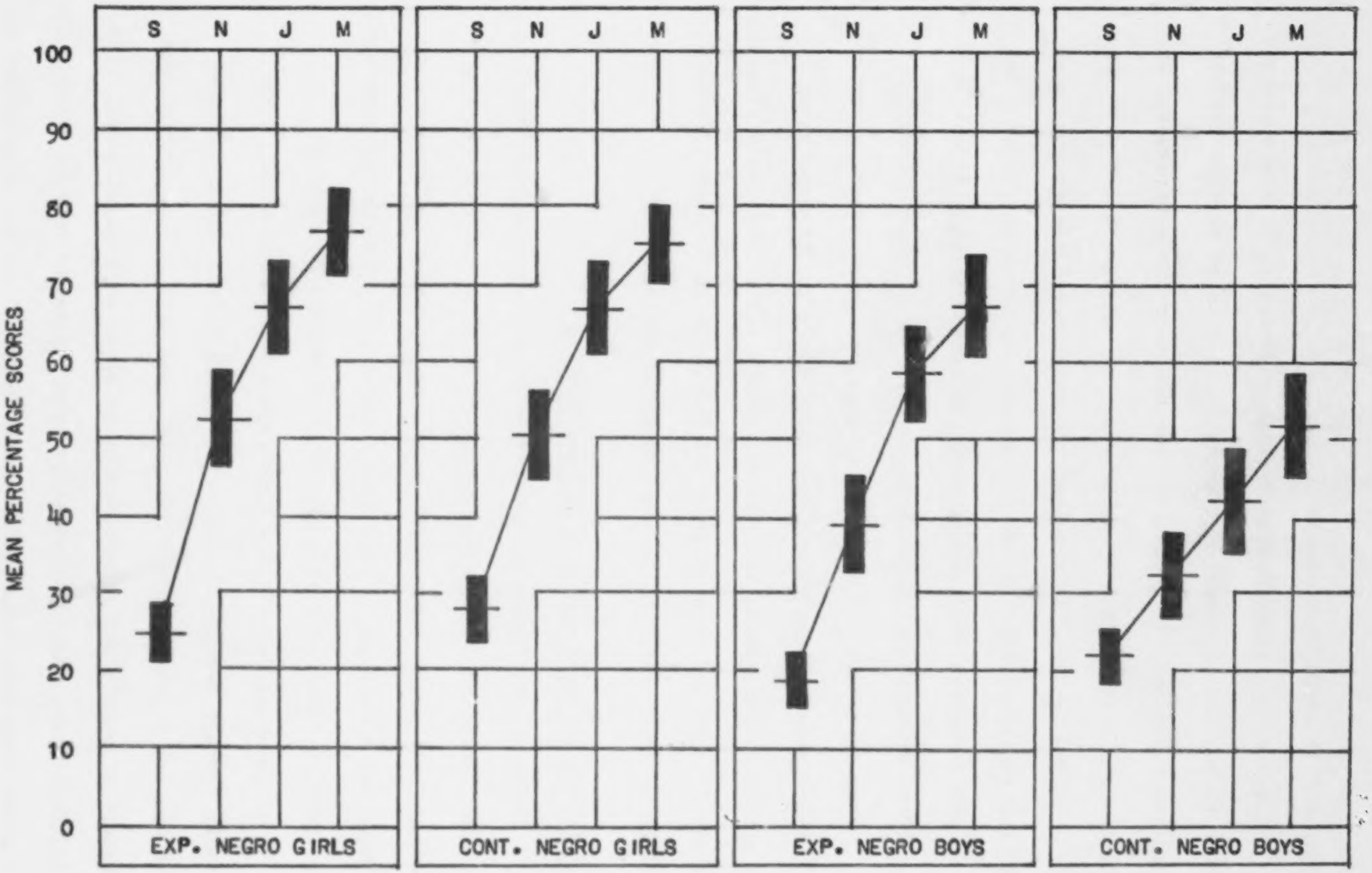


Fig. 22.--Growth curves of Negro subjects in Phonemes.

Phonemes skills among Negro girls.

However, the experimental treatment proved to be significantly superior to the control treatment among Negro boys at certain periods of the investigation. In September, the bands of the experimental and of the control Negro boys overlapped with the nonsignificant difference in favor of the latter. In November the experimental Negro boys surpassed the control group but the difference was not significant. In January and March the differences were statistically significant in favor of the experimental Negro boys.

When intensive and specific reading readiness training was provided, there were no significant sex differences in Phonemes among Negro subjects. But among the control group, differences were statistically significant and were in favor of the girls in November, January, and March although their bands overlapped in September.

Growth curves of Negro subjects in Word Meaning

Table 25 and Figure 23 indicate that the experimental Negro girls grew continuously in Word Meaning throughout the four testing periods. Their growth was significant from September to November and from November to January. Significant gains every two months from September through March were made by the experimental Negro boys.

The control Negro girls also grew steadily but slowly from September through March. The increments made within any two months period was not significant but the gains made within four months from September to January and from November to March were significant. The control Negro boys also grew steadily from September through March. The improvement they made from September to November was not significant but

TABLE 25

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN WORD MEANING FOR NEGRO SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls				
Mean	29.6	37.9	54.5	60.8
σ	12.1	15.6	18.2	15.3
σ_M	1.2	1.6	1.8	1.5
95% Confidence	27.2	34.8	50.9	57.8
Interval Band	32.0	40.9	58.1	63.8
Cont. Negro Girls				
Mean	34.0	36.9	44.0	48.5
σ	13.0	25.4	18.1	16.9
σ_M	1.3	2.6	1.8	1.7
95% Confidence	31.5	31.9	40.4	45.2
Interval Band	36.6	41.9	47.6	51.9
Exp. Negro Boys				
Mean	28.4	40.5	54.4	63.0
σ	13.4	14.1	19.8	16.2
σ_M	1.4	1.5	2.0	1.7
95% Confidence	25.6	37.6	50.4	59.7
Interval Band	31.1	43.3	58.4	66.3
Cont. Negro Boys				
Mean	33.7	38.0	41.5	48.3
σ	16.4	14.3	15.6	16.9
σ_M	1.7	1.5	1.6	1.8
95% Confidence	30.4	35.1	38.4	44.8
Interval Band	37.1	40.9	44.7	51.7

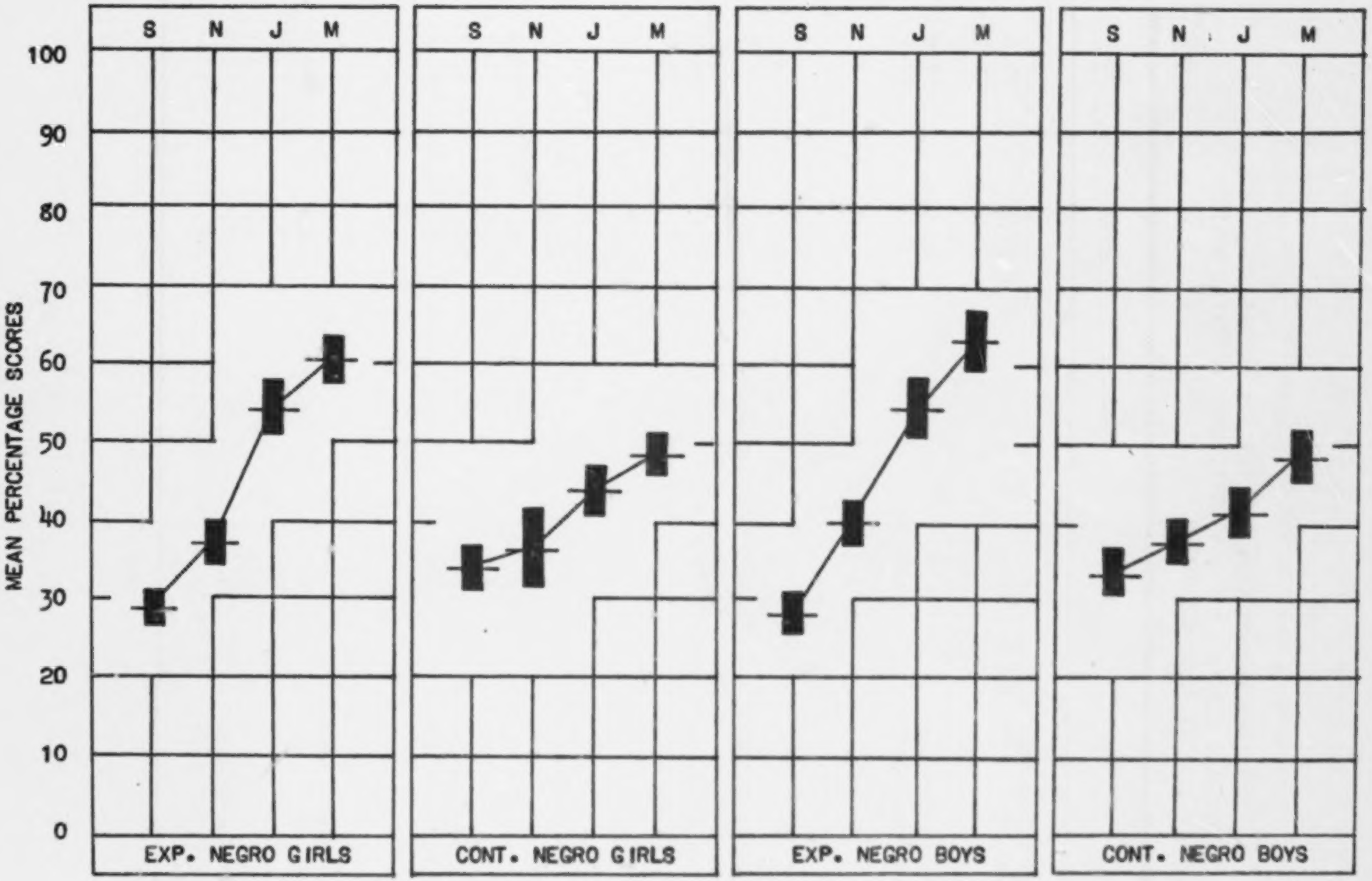


Fig. 23.--Growth curves of Negro subjects in Word Meaning.

that which they made within four months from September to January was. Between January and March their mean increase was significant.

The experimental treatment was evidently superior to the basal readers program in the development of Word Meaning skills among Negro subjects. Although the control Negro girls had significantly higher scores than the experimental Negro girls in September, the latter caught up with and surpassed the former in November though the difference was not significant. In January and March the differences were statistically significant favoring the experimental group. This pattern of growth in Word Meaning was also true of the experimental and control Negro boys.

There seemed to be no significant differences associated with sex in the development of Word Meaning skills among Negro subjects as shown by the overlapping bands of the experimental Negro girls with those of the experimental Negro boys as well as by the overlapping bands of the control Negro girls with those of the control Negro boys in September, November, January, and March.

Growth curves of Negro subjects in Listening

As revealed by Table 26 and Figure 24, the experimental Negro girls and boys grew continuously in Listening skills from September through March. They made significant gains from September to November and from November to January.

The control Negro girls had a significant increase in mean percentage scores in Listening from September to November, a nonsignificant gain from November to January, and a nonsignificant decrease from January to March. It was interesting to note the wide dispersion of Listening scores of Negro girls (control) in November as shown by the extra-

TABLE 26

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN LISTENING FOR NEGRO SUBJECTS

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls				
Mean	48.2	61.4	67.9	70.6
σ	14.1	14.3	13.4	15.5
σ_M	1.4	1.4	1.3	1.6
95% Confidence	45.5	58.5	65.2	67.5
Interval Band	51.0	64.2	70.5	73.6
Cont. Negro Girls				
Mean	49.4	63.6	67.0	65.3
σ	15.5	41.0	13.1	14.4
σ_M	1.6	4.1	1.3	1.4
95% Confidence	46.4	55.6	64.3	62.4
Interval Band	52.5	71.7	69.5	68.1
Exp. Negro Boys				
Mean	44.0	56.7	65.9	68.7
σ	19.4	15.2	16.1	15.6
σ_M	2.0	1.6	1.7	1.6
95% Confidence	40.1	53.6	62.7	65.6
Interval Band	48.0	59.7	69.2	71.9
Cont. Negro Boys				
Mean	48.0	56.6	60.3	62.5
σ	17.1	14.4	16.1	16.0
σ_M	1.8	1.5	1.7	1.7
95% Confidence	44.5	53.7	57.1	59.2
Interval Band	51.5	59.5	63.6	65.8

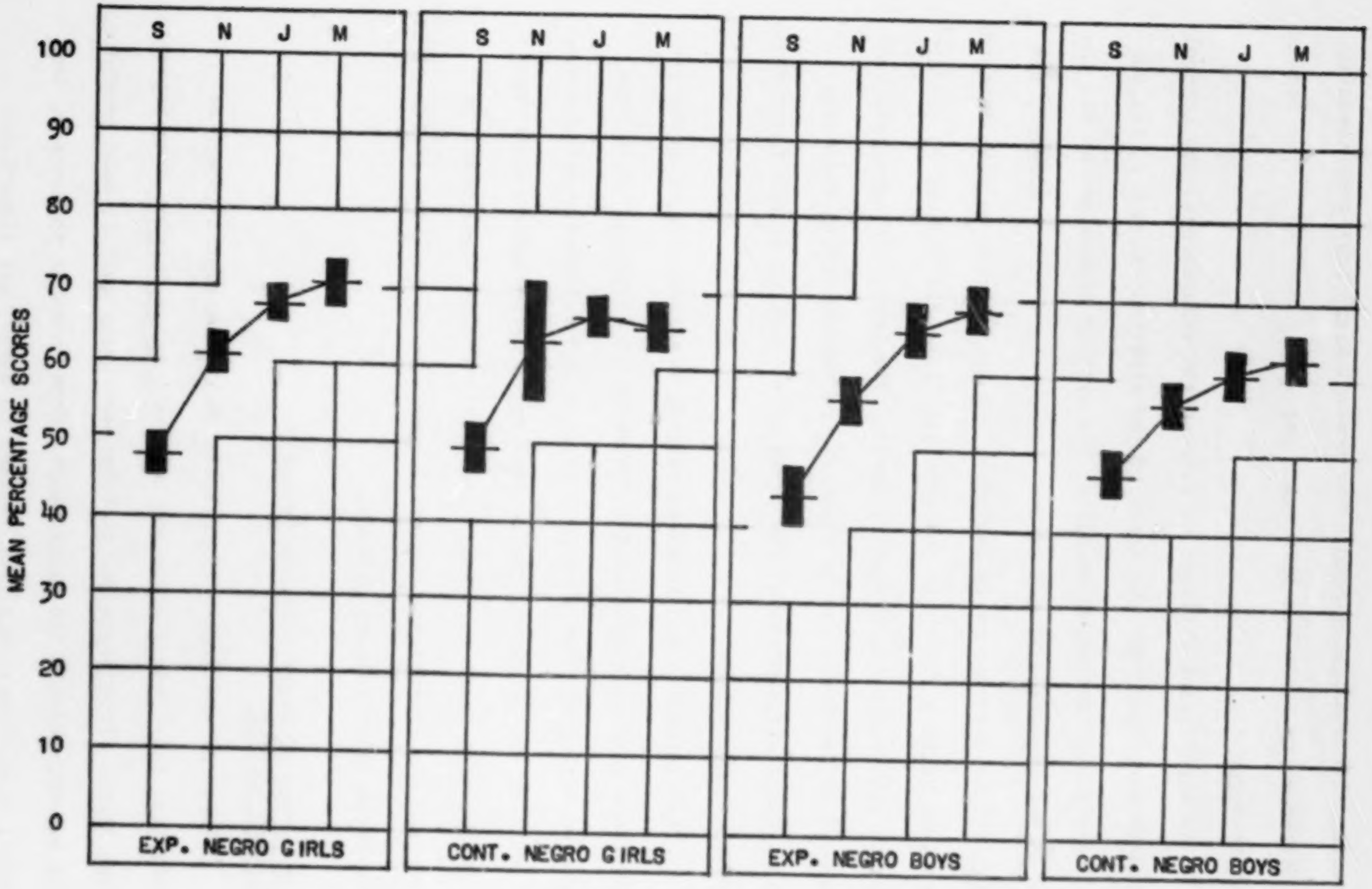


Fig . 24.--Growth curves of Negro subjects in Listening.

ordinarily wide confidence band. The control Negro boys grew steadily from September to March but their gain was significant only from September to November.

No significant differences between the experimental and control treatments were found for the bands of the experimental and of the control Negro girls overlapped at all of the testing points and so did the bands of the experimental and of the control Negro boys. However, the nonsignificant differences in September and in November were in favor of the control Negro girls while the nonsignificant differences in January and March favored the experimental girls. For boys, the nonsignificant difference in September was in favor of the control group while the nonsignificant differences at the three other testing points favored the experimental Negro boys.

When intensive and extended reading readiness training was provided, there were no significant differences in Listening which were associated with sex. But when no intensive and extended reading readiness training was provided, the control Negro girls had an advantage over the control Negro boys which was statistically significant in January and not significant but still consistently in favor of the girls at the three other testing periods.

Growth curves of Negro subjects (young) in Pattern Copying

Table 27 and Figure 25 indicate an uninterrupted growth of experimental Negro young girls and boys in Pattern Copying from September through March. From September to November their gain in mean percentage scores was appreciable and significant, from November to January, less but still significant, and from January to March, not significant.

TABLE 27

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PATTERN COPYING FOR NEGRO SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Young				
Mean	6.3	18.7	29.1	36.5
σ	7.7	14.1	17.7	19.3
σ_M	1.1	2.0	2.5	2.8
95% Confidence	4.1	14.8	24.1	31.1
Interval Band	8.4	22.6	34.0	41.9
Cont. Negro Girls, Young				
Mean	7.1	8.7	16.8	21.7
σ	9.3	10.0	15.0	15.5
σ_M	1.3	1.4	2.1	2.2
95% Confidence	4.5	5.9	12.6	17.4
Interval Band	9.6	11.5	20.9	26.0
Exp. Negro Boys, Young				
Mean	6.4	18.3	27.8	33.5
σ	9.5	14.9	18.2	21.5
σ_M	1.3	2.0	2.5	2.9
95% Confidence	3.8	14.4	23.0	27.8
Interval Band	8.9	22.3	32.6	39.2
Cont. Negro Boys, Young				
Mean	7.3	9.4	17.7	21.2
σ	8.4	9.0	12.7	14.3
σ_M	1.1	1.2	1.7	1.9
95% Confidence	5.1	7.0	14.4	17.4
Interval Band	9.6	11.8	21.1	25.0

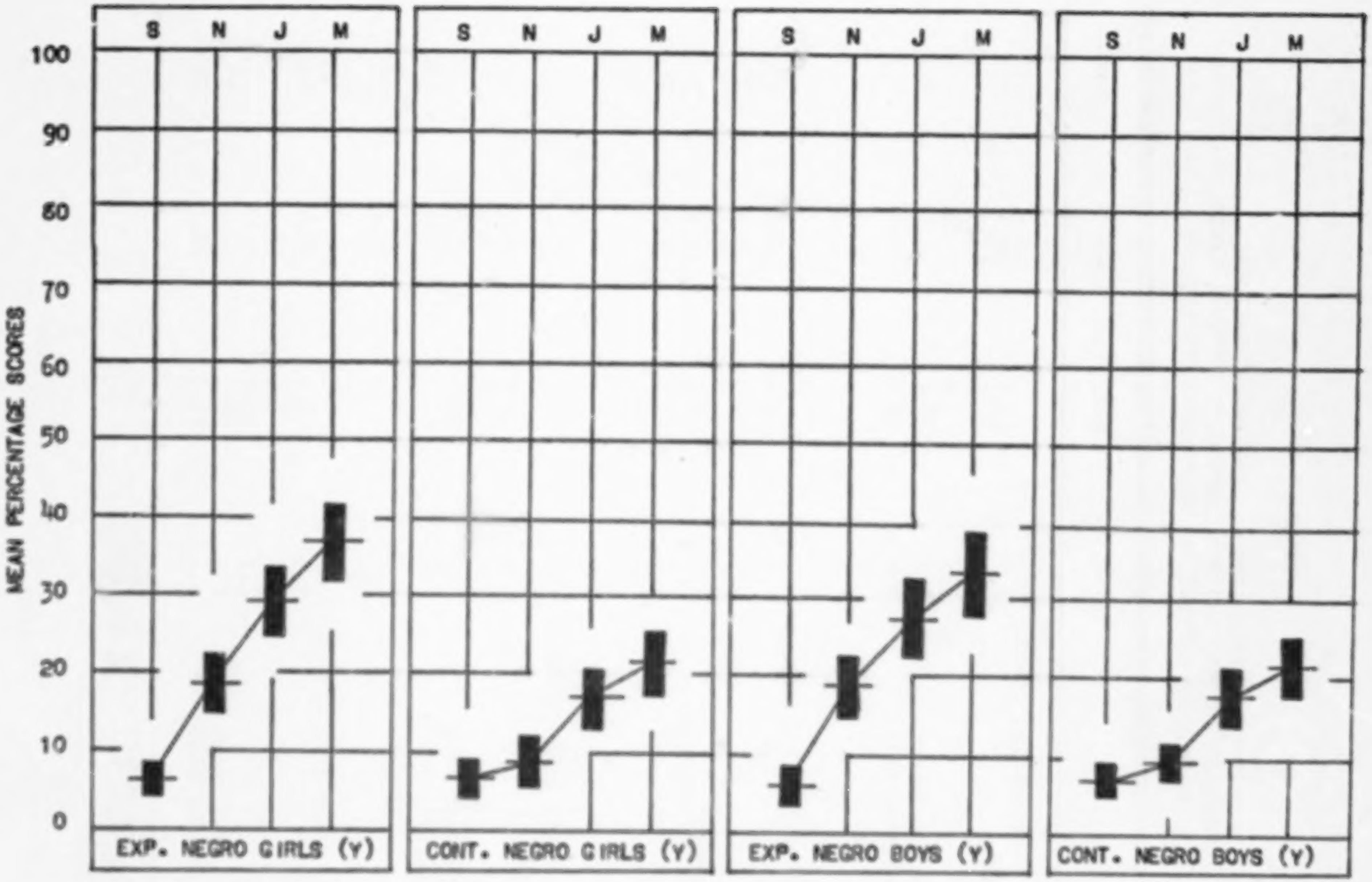


Fig. 25.--Growth curves of Negro subjects (young) in Pattern Copying.

The control Negro young girls and boys also had a continuous but slower growth in Pattern Copying from September to March. However, their gain was significant only from November to January and nonsignificant at the other two-month intervals.

The experimental treatment was significantly superior to the basal readers program in the development of skills associated with Pattern Copying among Negro young subjects. In September the bands of the four groups (experimental Negro young girls, experimental Negro young boys, control Negro young boys, and control Negro young girls) overlapped with the nonsignificant differences favoring both control groups. At the succeeding testing periods, the differences were statistically significant in favor of the experimental groups. As a matter of fact, in March the control groups reached the level attained by the experimental groups in January and the difference was still in favor of the experimental groups.

No significant sex differences in Pattern Copying were exhibited by the young Negro subjects under either treatment.

Growth curves of Negro subjects (young) in Identical Forms

As shown by the data presented in Table 28 and Figure 26, the experimental young Negro girls and boys grew continuously in Identical Forms from September through March. Significant increases in mean percentage scores were made by the girls from November to January and by the boys not only within the same period but also from September to November. Both groups made almost imperceptible and nonsignificant gains from January to March.

The control Negro girls (young) made a considerable and signifi-

TABLE 28

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN IDENTICAL FORMS FOR NEGRO SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Young				
Mean	20.3	29.1	38.9	39.9
σ	22.1	11.7	11.5	15.3
σ_M	3.2	1.7	1.6	2.2
95% Confidence	14.1	25.9	35.7	35.6
Interval Band	26.5	32.4	42.1	44.1
Cont. Negro Girls, Young				
Mean	20.3	40.7	40.7	42.4
σ	18.4	24.3	25.1	22.3
σ_M	2.6	3.4	3.5	3.1
95% Confidence	15.2	33.9	33.8	36.3
Interval Band	25.4	47.4	47.7	48.6
Exp. Negro Boys, Young				
Mean	11.6	21.6	32.7	33.0
σ	12.6	14.5	14.3	14.0
σ_M	1.7	2.0	1.9	1.9
95% Confidence	8.2	17.8	28.9	29.3
Interval Band	14.9	25.4	36.4	36.7
Cont. Negro Boys, Young				
Mean	22.6	36.3	35.4	40.6
σ	22.8	23.0	25.7	24.6
σ_M	3.1	3.1	3.5	3.4
95% Confidence	16.5	30.2	28.6	34.0
Interval Band	28.7	42.4	42.3	47.2

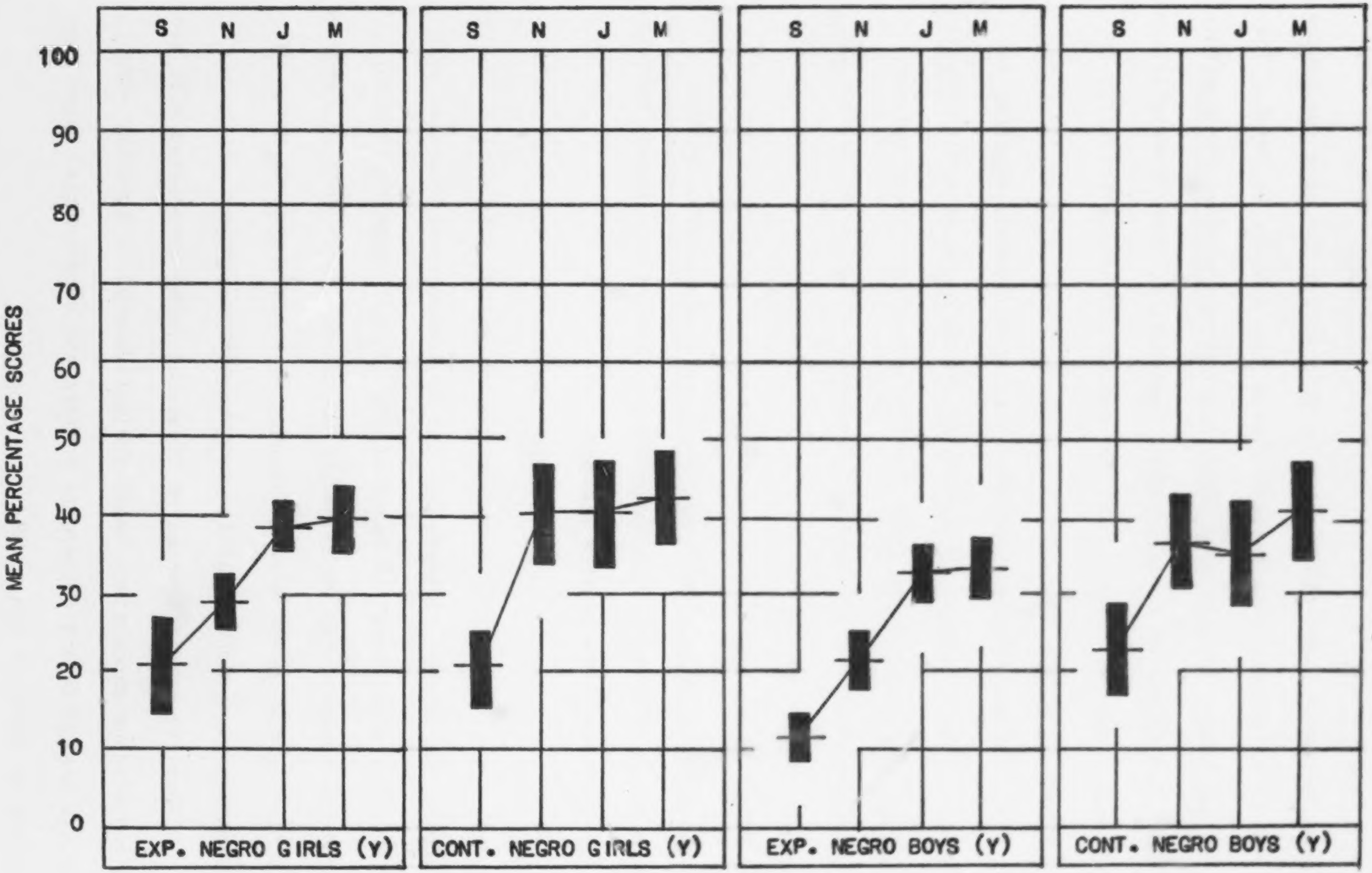


Fig. 26.--Growth curves of Negro subjects (young) in Identical Forms.

increase in their mean percentage scores in Identical Forms from September to November, made practically no gain within the next two months, then made a slight and nonsignificant gain from January to March. The control Negro boys (young) grew significantly in Identical Forms within the first two months of formal reading instruction, then fluctuated nonsignificantly down within the next two months and nonsignificantly up from January to March.

The control treatment proved to be significantly superior to the experimental treatment in developing skills associated with Identical Forms among young Negro girls particularly within the first two months of training for in September the bands of the experimental and of the control groups overlapped with the nonsignificant difference in favor of the experimental Negro young girls but in November the difference was statistically significant in favor of the control group. Differences in January and in March were no longer significant but still continued to favor the control group.

Among the Negro young boys' groups, however, the experimental treatment was significantly superior to the control treatment at certain periods of the study. In September and in November, differences were statistically significant in favor of the control young Negro boys. In January the experimental group caught up and the difference in favor of the control group became nonsignificant. The difference in March was also nonsignificant and still favored the control group.

Significant differences in Identical Forms associated with sex were not evident among young Negro subjects except in November when there was a significant difference between the experimental Negro boys and girls in favor of the girls.

Growth curves of Negro subjects (young) in Auditory Discrimination

Table 29 and Figure 27 reveal a continuous growth in Auditory Discrimination made by the experimental young Negro girls and boys throughout the period of investigation from September through March. Both groups had significant gains from September to November and from November to January.

Steady growth in Auditory Discrimination was also exhibited by the control young Negro girls whose gain was significant within the first two months of formal reading instruction and by the control young Negro boys whose gains were significant not only within the first two months but also within the second two month interval.

There were no significant differences between the experimental and control treatments in the development of Auditory Discrimination inasmuch as the bands of the four groups overlapped at each of the four testing periods. The experimental groups however, did maintain their nonsignificant advantage over the control groups from September through March.

Significant differences associated with sex in Auditory Discrimination were not evident among the young Negro subjects in each program.

Growth curves of Negro subjects (young) in Phonemes

Table 30 and Figure 28 show a steady growth in Phonemes made by the experimental Negro young girls as well as boys from September through March. Within the first two months of reading readiness training, the experimental Negro young girls had a rapid and significant increase in their mean scores. During each succeeding two months, their gains were

TABLE 29

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN AUDITORY DISCRIMINATION FOR NEGRO SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Young				
Mean	19.3	42.5	60.7	71.3
σ	21.9	29.8	29.6	27.8
σ_M	3.1	4.3	4.2	4.0
95% Confidence	13.1	34.1	52.4	63.5
Interval Band	25.4	50.8	69.0	79.1
Cont. Negro Girls, Young				
Mean	16.9	38.6	50.2	58.7
σ	20.1	27.7	32.3	27.8
σ_M	2.8	3.9	4.6	3.9
95% Confidence	11.3	31.0	41.3	51.0
Interval Band	22.5	46.3	59.2	66.4
Exp. Negro Boys, Young				
Mean	16.2	34.2	54.9	60.6
σ	19.2	27.3	31.9	29.6
σ_M	2.6	3.7	4.3	4.0
95% Confidence	11.1	26.9	46.5	52.5
Interval Band	21.3	41.4	63.4	68.5
Cont. Negro Boys, Young				
Mean	14.4	27.8	44.4	47.0
σ	20.1	28.7	30.5	30.1
σ_M	2.7	3.9	4.1	4.1
95% Confidence	9.1	20.2	36.3	39.0
Interval Band	19.8	35.5	52.6	55.1

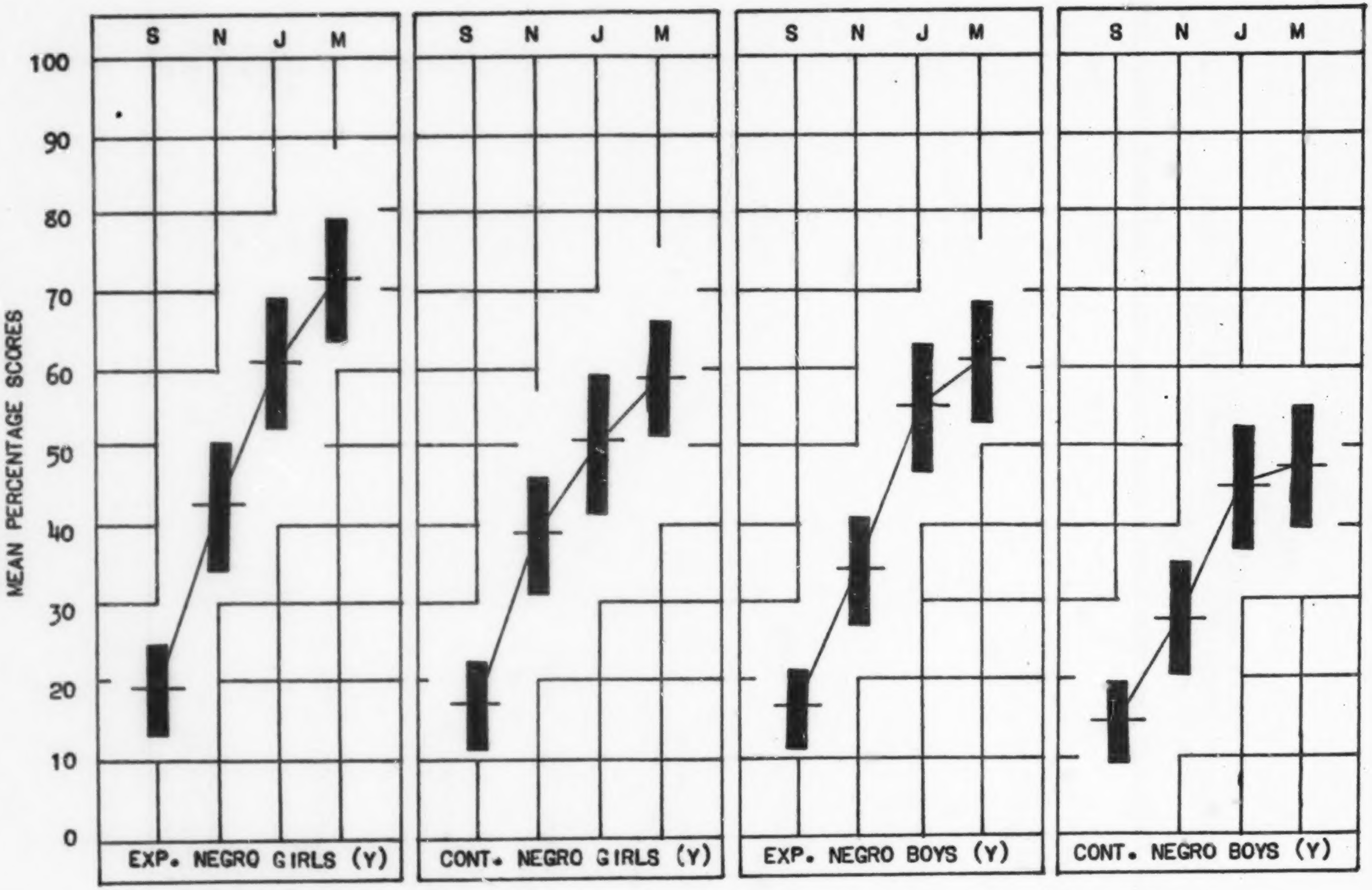


Fig. 27.--Growth curves of Negro subjects (young) in Auditory Discrimination.

TABLE 30

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PHONEMES FOR NEGRO SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Young				
Mean	23.0	53.7	65.8	77.5
σ	21.0	33.1	32.5	29.1
σ_M	3.0	4.7	4.6	4.2
95% Confidence	17.1	44.4	56.7	69.4
Interval Band	28.8	62.9	74.9	85.7
Cont. Negro Girls, Young				
Mean	28.1	46.6	64.6	75.3
σ	19.8	28.2	29.4	27.0
σ_M	2.8	4.0	4.2	3.8
95% Confidence	22.6	38.8	56.2	67.8
Interval Band	33.6	54.4	72.5	82.8
Exp. Negro Boys, Young				
Mean	18.4	34.5	54.1	63.0
σ	19.7	33.4	34.0	34.9
σ_M	2.7	4.5	4.6	4.7
95% Confidence	13.2	25.6	45.1	53.7
Interval Band	23.7	43.3	63.1	72.2
Cont. Negro Boys, Young				
Mean	21.6	34.3	43.5	52.8
σ	18.3	30.7	31.8	29.7
σ_M	2.5	4.2	4.3	4.0
95% Confidence	16.7	26.1	35.0	44.9
Interval Band	26.5	42.4	52.0	60.7

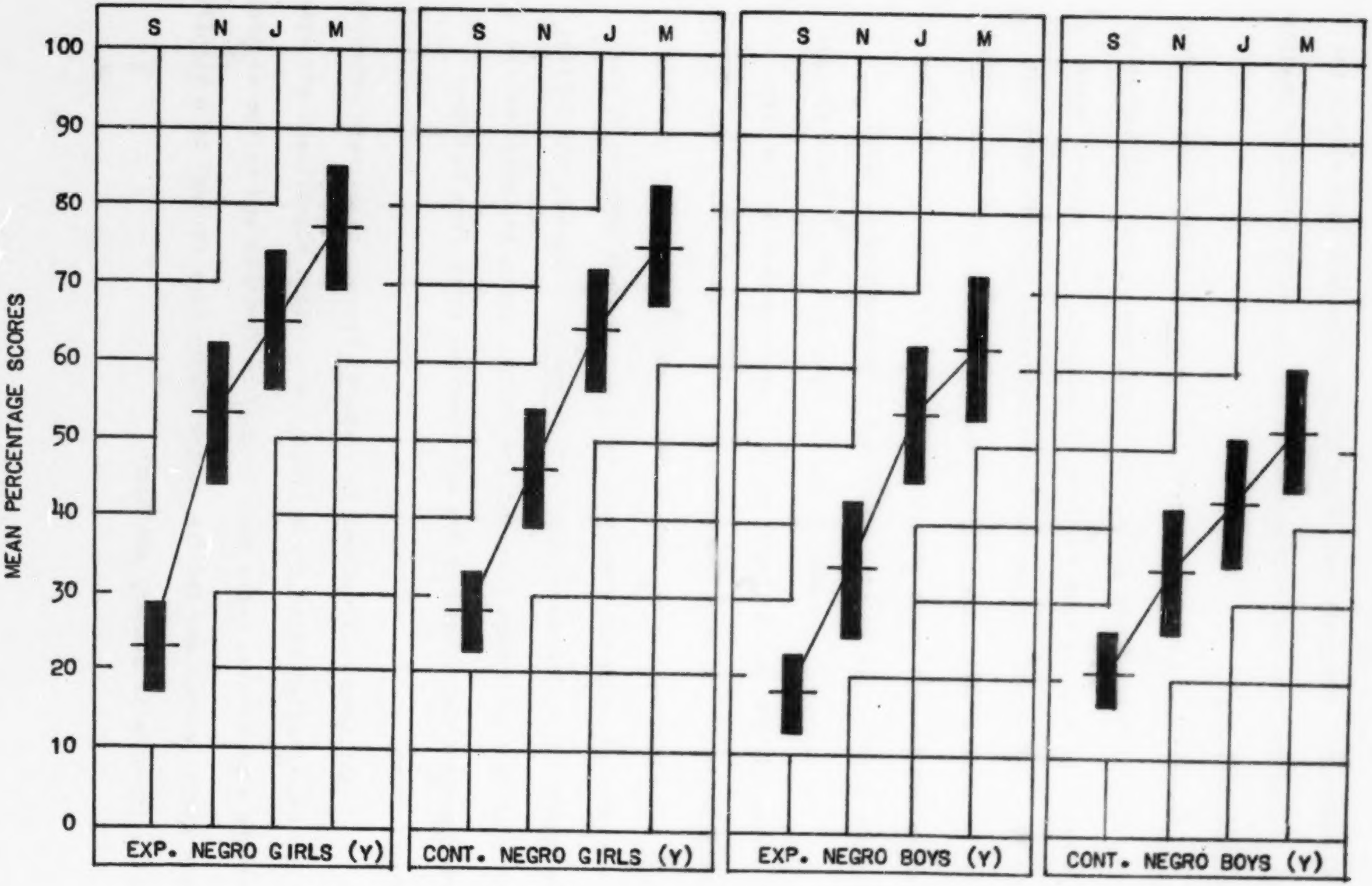


Fig. 28.--Growth curves of Negro subjects (young) in Phonemes.

not significant. The boys made significant gains not only within the first two months but also within the second two month period of reading readiness training.

An unbroken series of growth in Phonemes was also demonstrated by the control Negro young girls with significant gains from September to November as well as from November to January. The control Negro young boys grew continuously, too, from September through March but failed to make a significant improvement during any two months. They did make significant gains within four months of formal reading instruction from September to January and from November to March.

The overlapping bands of the experimental Negro girls (young) with those of the control Negro girls (young) as well as the overlapping bands of the experimental Negro boys (young) with those of the control Negro group showed that no significant differences existed between the experimental treatment and basal readers program in the development of skills associated with Phonemes. However, the initial nonsignificant advantage favoring the control group in September was taken over and maintained by the experimental group from November through March.

Significant differences in Phonemes between sexes were exhibited by the experimental Negro girls (young) who held a significant advantage over the experimental Negro boys (young) in November and by the control Negro girls (young) who led the control Negro boys (young) by a significant difference in January and March.

Growth curves of Negro subjects (young) in Word Meaning

As indicated by Table 31 and Figure 29, the experimental Negro girls (young) made significant gains in mean percentage scores in Word Meaning from September to November and from November to January. They continued to improve but not significantly from January to March. The experimental Negro boys (young) bettered this record by making significant gains every two months.

Continuous but slow growth in Word Meaning was shown by the control young Negro girls and boys. No significant gains were made by either group within any of the two month training periods. Both sexes did make significant gains within four months, from September to January and from November to March.

In the development of Word Meaning skills, the experimental procedure was significantly superior to the basal readers program. In September the nonsignificant differences were in favor of the control Negro girls (young) and control Negro boys (young). In November the experimental Negro girls surpassed the control group although the difference was not significant. In January and March differences were statistically significant in favor of the experimental girls. In September and November, the control Negro boys (young) held the nonsignificant advantage over the experimental boys. In January the difference was not significant but favored the experimental group. In March the difference was statistically significant and still favored the experimental boys.

There were no evidences of significant sex differences in Word Meaning among young Negro subjects under either treatment.

TABLE 31

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS,
STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS
IN WORD MEANING FOR NEGRO SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Young				
Mean	27.3	36.4	53.2	59.7
σ	10.6	16.1	16.3	14.5
σ_M	1.5	2.3	2.3	2.1
95% Confidence	24.3	31.9	48.6	55.6
Interval Band	30.3	40.8	57.8	63.8
Cont. Negro Girls, Young				
Mean	32.6	33.9	41.1	46.6
σ	11.8	14.2	18.4	18.0
σ_M	1.7	2.0	2.6	2.5
95% Confidence	29.4	29.9	36.0	41.6
Interval Band	35.9	37.8	46.2	52.6
Exp. Negro Boys, Young				
Mean	26.6	37.8	50.2	60.7
σ	13.8	15.7	19.9	17.2
σ_M	1.9	2.1	2.7	2.3
95% Confidence	22.9	33.7	45.0	56.1
Interval Band	30.2	42.0	55.5	65.2
Cont. Negro Boys, Young				
Mean	33.0	38.7	42.0	50.6
σ	16.6	15.2	16.8	17.9
σ_M	2.3	2.1	2.3	2.4
95% Confidence	28.6	34.6	37.5	45.8
Interval Band	37.4	42.7	46.5	55.4

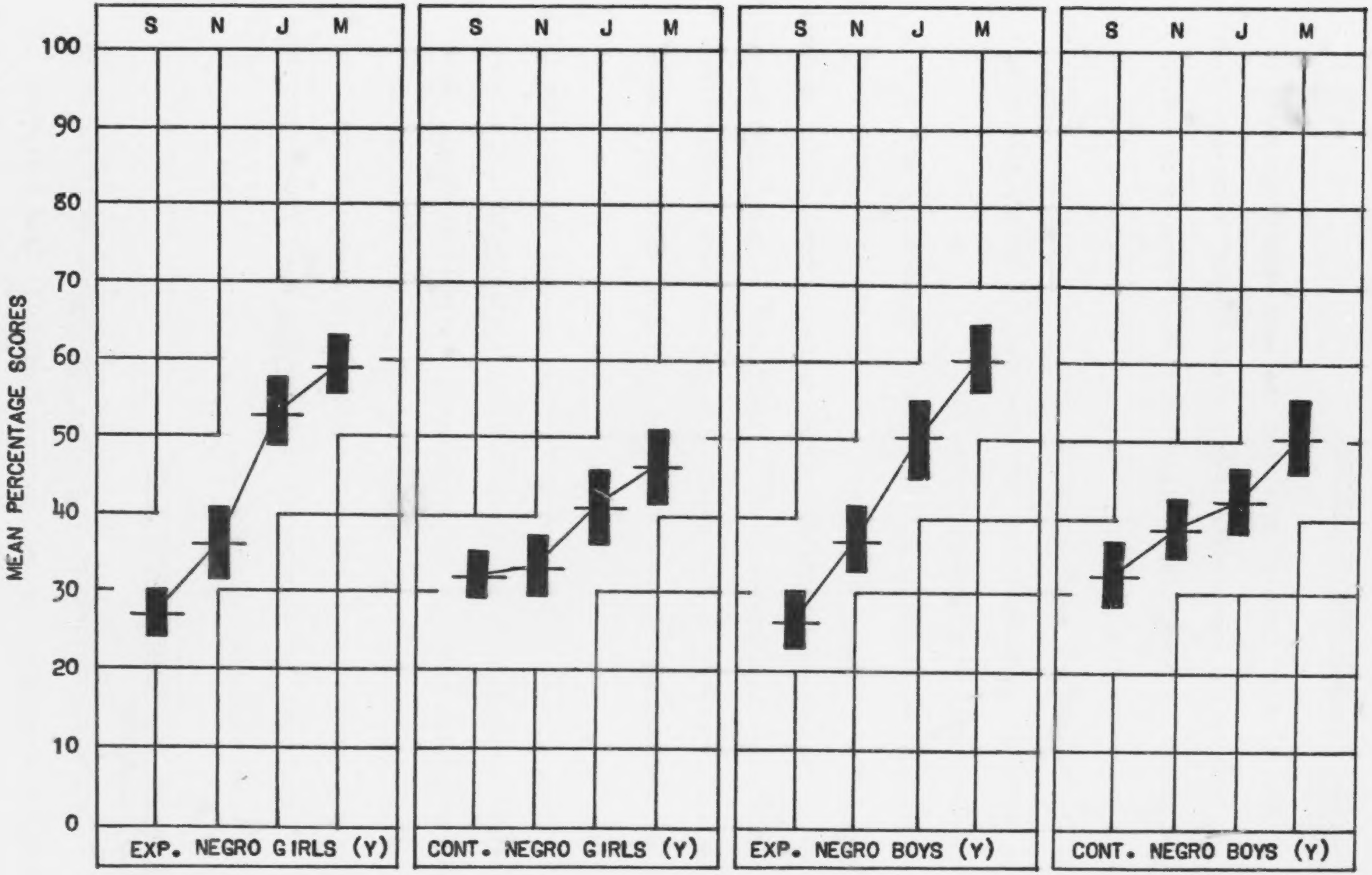


Fig. 29.--Growth curves of Negro subjects (young) in Word Meaning.

Growth curves of Negro subjects (young) in Listening

Table 32 and Figure 30 show that the mean percentage gains in Listening made by the experimental Negro girls (young) were significant from September to November, near significant from November to January, and not significant from January to March. The experimental Negro boys (young) increased their mean percentage scores in Listening significantly from September to November and from November to January then made a nonsignificant gain from January to March.

The control Negro girls (young) made significant gains in Listening from September to November, a nonsignificant increase from November to January, and a nonsignificant decrease from January to March. The control Negro boys started with a significant increase from September to November. Their gains from November to January were nonsignificant and those from January to March were nonsignificant and almost imperceptible.

There were no significant differences between the experimental and control treatments in the development of Listening skills as shown by the overlapping bands of the experimental Negro girls (young) with those of the control girls as well as the overlapping bands of the experimental Negro boys (young) with those of the control group.

Significant sex differences in Listening among young Negro subjects were not supported by the data.

Growth curves of Negro subjects (old) in Pattern Copying

Continuous improvement in Pattern Copying was exhibited by the experimental Negro girls as well as boys (both old) from September

TABLE 32

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN LISTENING FOR NEGRO SUBJECTS (YOUNG)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Young				
Mean	46.9	60.3	67.9	68.5
σ	14.7	14.1	13.9	15.1
σ_M	2.1	2.0	2.0	2.2
95% Confidence	42.8	56.4	64.0	64.3
Interval Band	51.1	64.3	71.7	72.7
Cont. Negro Girls, Young				
Mean	46.6	58.6	65.9	62.7
σ	15.5	15.4	11.4	12.8
σ_M	2.2	2.2	1.6	1.8
95% Confidence	42.3	54.4	62.7	59.2
Interval Band	50.9	62.9	69.0	66.3
Exp. Negro Boys, Young				
Mean	43.1	55.9	65.0	68.2
σ	18.4	15.8	15.5	16.5
σ_M	2.5	2.1	2.1	2.2
95% Confidence	38.2	51.7	60.9	63.8
Interval Band	47.9	60.1	69.1	72.6
Cont. Negro Boys, Young				
Mean	47.3	56.5	61.9	62.6
σ	16.0	14.4	14.3	14.9
σ_M	2.2	2.0	1.9	2.0
95% Confidence	43.1	52.6	58.1	58.6
Interval Band	51.6	60.3	65.7	66.6

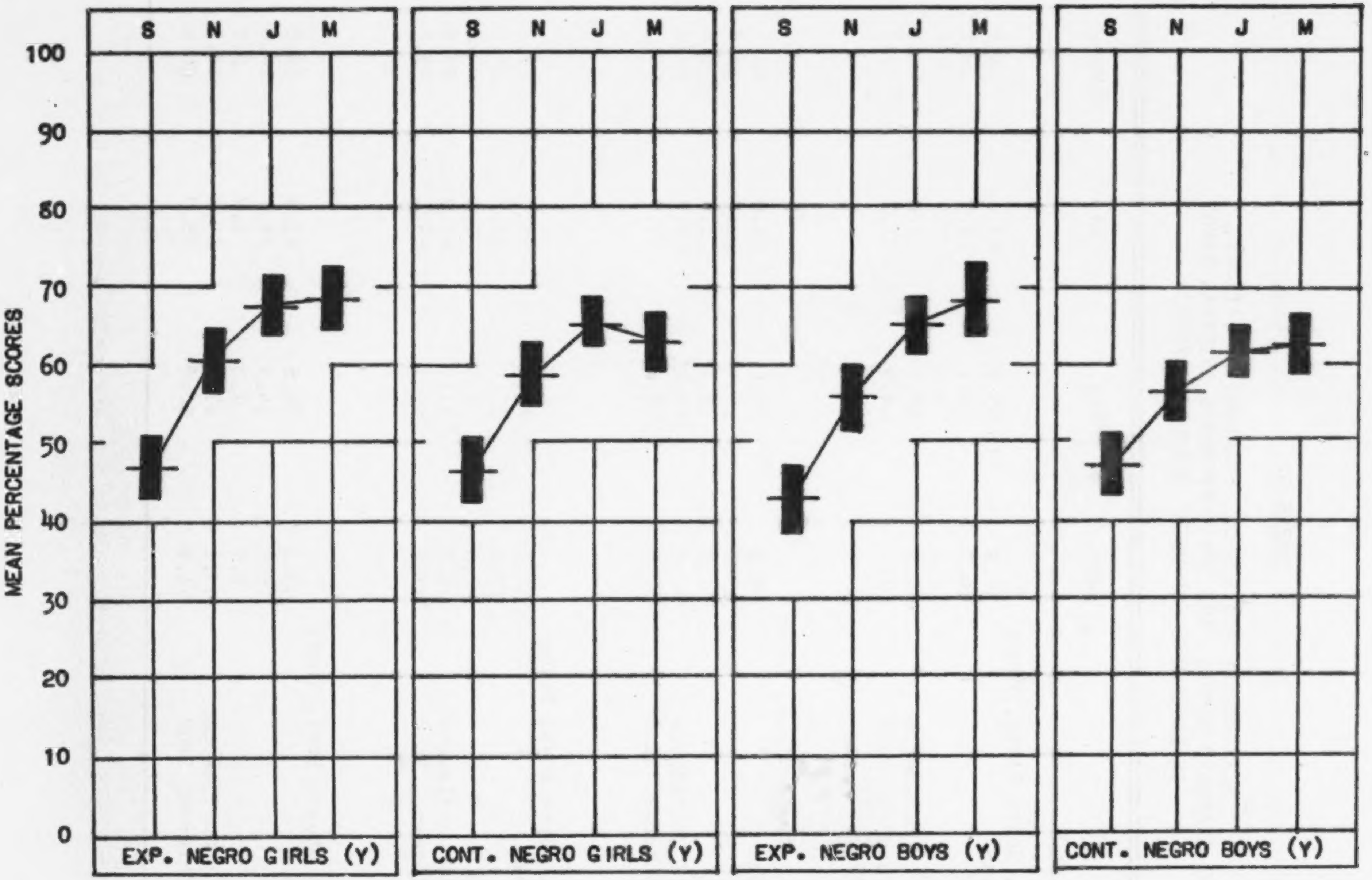


Fig. 30.--Growth curves of Negro subjects (young) in Listening.

through March as shown by Table 33 and Figure 31. The experimental Negro girls (old) had significant mean score gains from September to November as well as from November to January. The experimental Negro boys (old) also grew continuously in Pattern Copying but with significant gains in their mean percentage scores occurring only from September to November.

Continuous improvement in Pattern Copying was made by the control old Negro girls with significant gains only from November to January, after four months of formal reading instruction. Although the control Negro boys (old) had an unbroken series of improvement in Pattern Copying, none was significant at the .05 level within any two months time. Their gains within four months of formal reading instruction from September to January and from November to March were, however, significant.

The experimental procedure proved to be significantly superior to the basal readers program in developing Pattern Copying skills. Despite the fact that the control old Negro girls held the nonsignificant difference in their favor in September, they were surpassed to a significant degree by the experimental old Negro girls from November through March. It took the control girls all the period from November to March to reach the stage of achievement comparable with that attained by the experimental girls in January with the nonsignificant difference still in favor of the latter. The experimental old Negro boys were slightly and nonsignificantly ahead of the control boys in Pattern Copying in September. From November through March differences were statistically significant in favor of the experimental Negro boys (old). It was only in March that the control boys reached the level comparable with

TABLE 33

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PATTERN COPYING FOR NEGRO SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Old				
Mean	8.7	21.3	33.2	41.2
σ	9.9	16.3	17.2	18.5
σ_M	1.4	2.3	2.4	2.6
95% Confidence	5.9	16.8	28.4	36.0
Interval Band	11.4	25.8	37.9	46.3
Cont. Negro Girls, Old				
Mean	10.3	11.7	19.0	25.1
σ	8.7	10.1	13.7	17.5
σ_M	1.2	1.4	2.0	2.5
95% Confidence	7.9	8.9	15.1	20.2
Interval Band	12.7	14.5	22.8	30.0
Exp. Negro Boys, Old				
Mean	9.6	27.4	38.2	46.4
σ	11.0	16.6	20.6	19.2
σ_M	1.8	2.7	3.3	3.1
95% Confidence	6.1	22.1	31.6	40.3
Interval Band	13.1	32.7	44.7	52.5
Cont. Negro Boys, Old				
Mean	9.5	10.6	17.0	20.9
σ	10.0	9.8	13.7	13.4
σ_M	1.6	1.6	2.2	2.1
95% Confidence	6.3	7.5	12.6	16.7
Interval Band	12.6	13.7	21.3	25.1

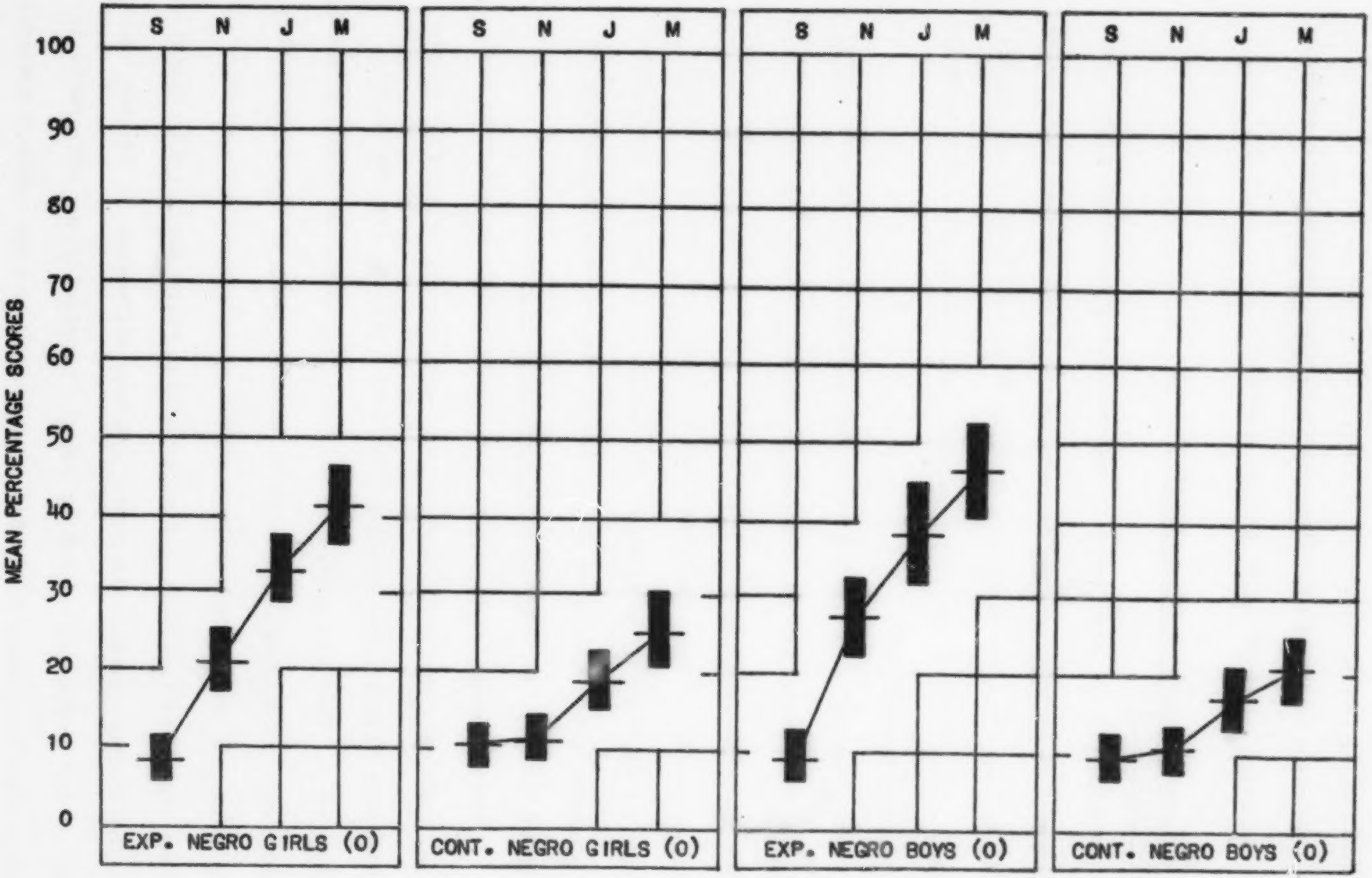


Fig. 31.--Growth curves of Negro subjects (old) in Pattern Copying.

that achieved by the experimental group in November.

No significant sex differences in Pattern Copying were evident among old Negro subjects under either treatment.

Growth curves of Negro subjects (old) in Identical Forms

From Table 34 and Figure 32 can be seen a rapid and significant improvement in Identical Forms made by the experimental old Negro girls as well as boys from September to November, another significant increase to reach a peak from November to January, and a nonsignificant decrease from January to March.

The control Negro girls (old) had a significant gain in Identical Forms from September to November, a nonsignificant decrease from November to January, and a nonsignificant increase from January to March. A nonsignificant increase from September to November, a nonsignificant decrease from November to January, and again a nonsignificant increase from January to March marked the fluctuating pattern of growth of control old Negro boys in Identical Forms.

The experimental treatment was significantly superior to the control treatment among old Negro girls particularly after four months of intensive and specific reading readiness training for the experimental group. This was proved by the fact that although the significant differences in September and November were in favor of the control Negro girls (old), in January after four months of intensive and specific reading readiness training, the experimental Negro girls (old) caught up with the control group. The nonsignificant difference in January was in favor of the control girls and so was the nonsignificant difference in March. Among old Negro boys, the experimental and the control treatments

TABLE 34

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN IDENTICAL FORMS FOR NEGRO SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Old				
Mean	17.7	31.6	44.3	44.1
σ	15.7	15.4	14.9	18.0
σ_M	2.2	2.2	2.1	2.5
95% Confidence	13.3	27.3	40.2	39.1
Interval Band	22.0	35.9	48.4	49.1
Cont. Negro Girls, Old				
Mean	30.7	49.6	47.2	50.0
σ	24.6	25.3	25.0	25.6
σ_M	3.5	3.6	3.6	3.7
95% Confidence	23.9	42.5	40.3	42.8
Interval Band	37.6	56.7	54.2	57.1
Exp. Negro Boys, Old				
Mean	14.1	28.2	41.2	39.8
σ	15.1	10.7	12.8	13.3
σ_M	2.4	1.7	2.1	2.2
95% Confidence	9.3	24.8	37.1	35.6
Interval Band	18.9	31.5	45.3	44.1
Cont. Negro Boys, Old				
Mean	26.0	38.2	34.4	36.8
σ	24.9	28.0	21.8	23.4
σ_M	4.0	4.5	3.5	3.7
95% Confidence	18.2	29.5	27.6	29.4
Interval Band	33.8	47.0	41.2	44.1

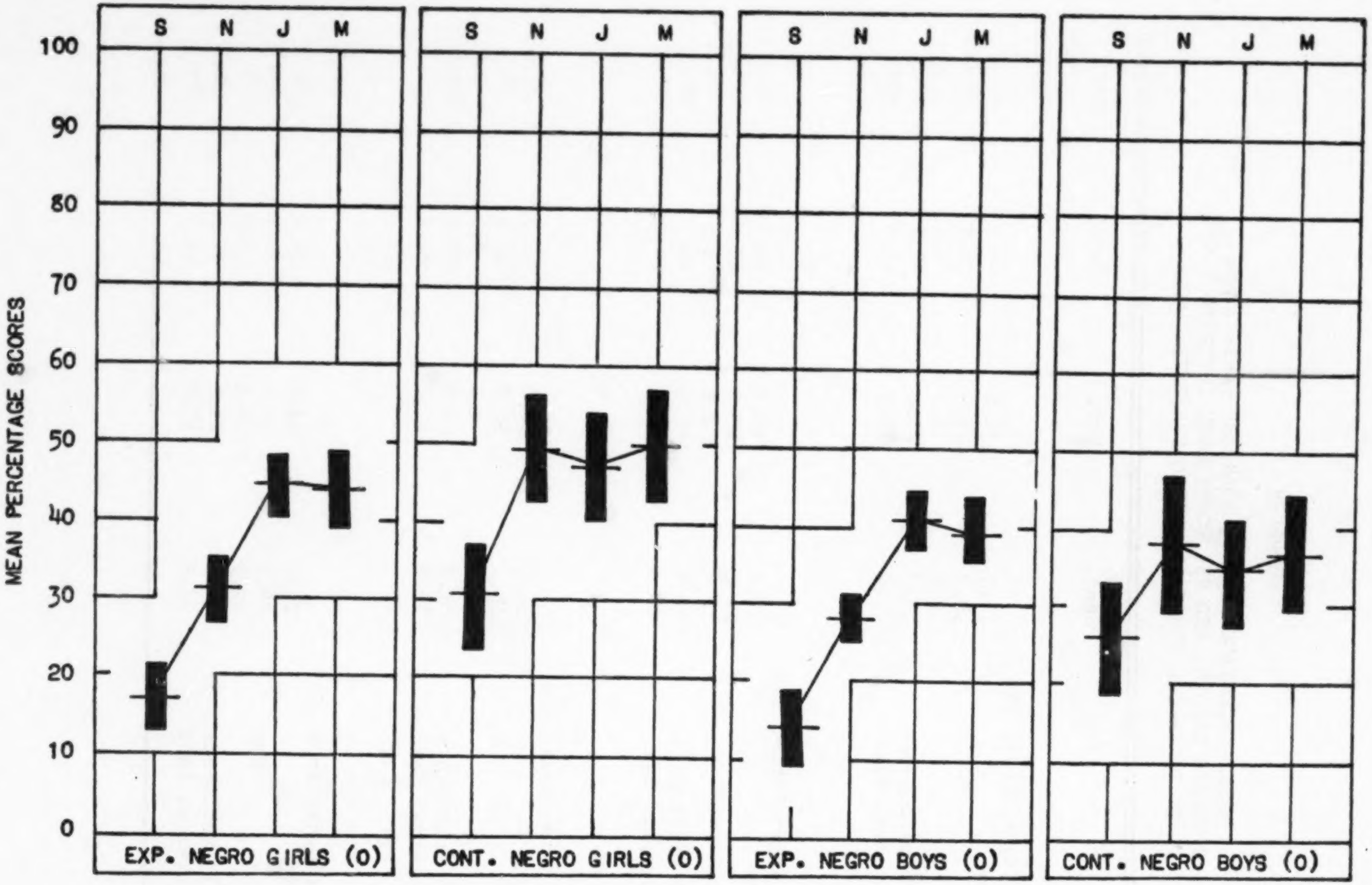


Fig. 32.--Growth curves of Negro subjects (old) in Identical Forms.

did not seem to have any significant differences as the bands of both groups overlapped at all testing points. The nonsignificant differences in September and November were in favor of the control boys while the nonsignificant differences in January and March favored the experimental group.

There were no evidences of significant sex differences in Identical Forms among old Negro subjects under either treatment.

Growth curves of Negro subjects (old) in Auditory Discrimination

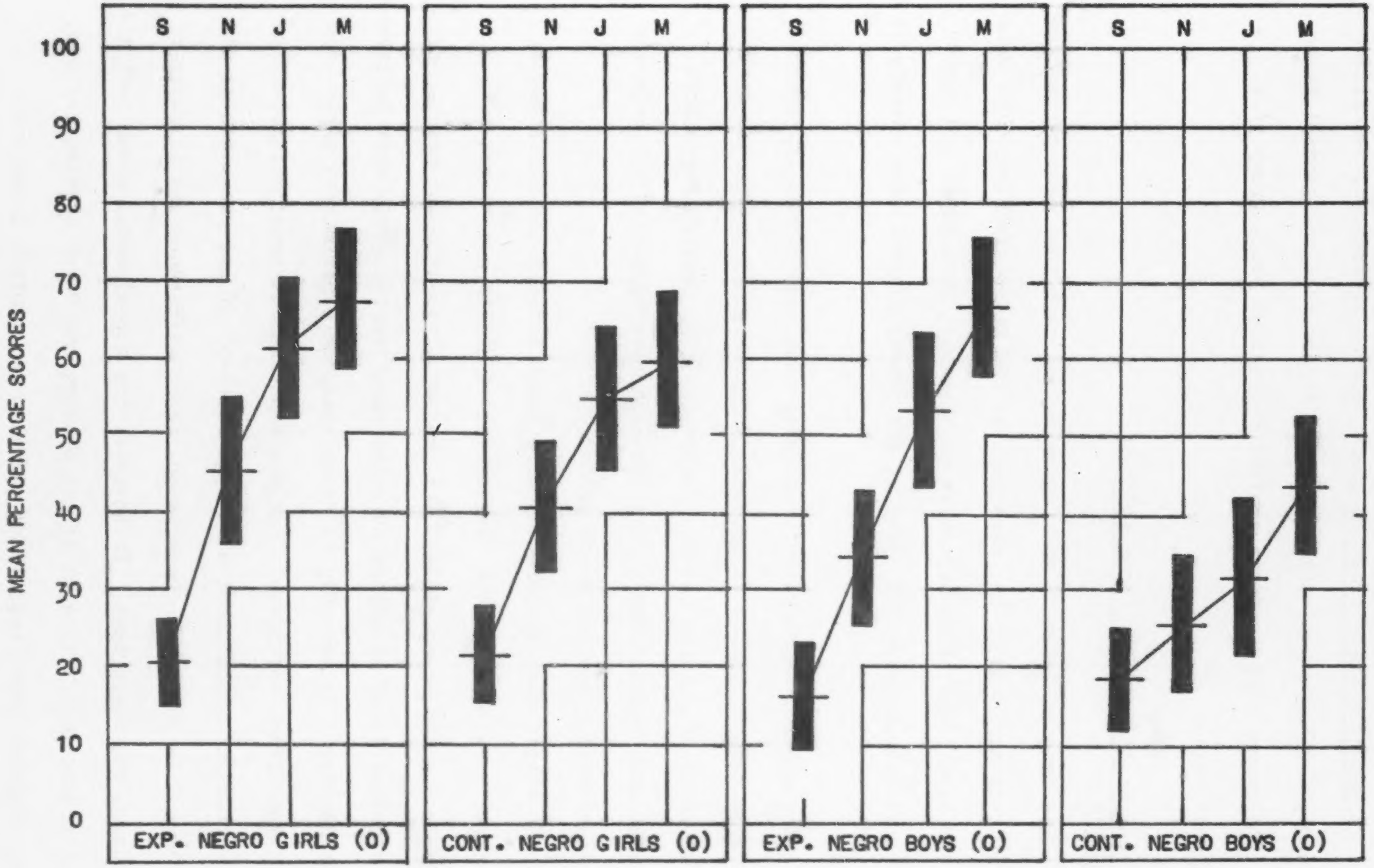
As revealed by Table 35 and Figure 33, the experimental Negro girls (old), control Negro girls (old), experimental Negro boys (old), and control Negro boys (old) grew continuously in Auditory Discrimination from September through March. Significant gains were made by the first three groups from September to November while the control Negro boys (old) made no significant gain within any two month interval.

The initial mean score difference in Auditory Discrimination between the experimental and control old Negro girls in September was nonsignificant and was in favor of the control group. Although the later differences in November, January, and March favored the experimental group, the differences were not statistically significant. As regards old Negro boys, the nonsignificant difference in September was in favor of the control group. In November, the nonsignificant difference was in favor of the experimental group. By January the difference in favor of the experimental group was significant and was maintained in March. For old Negro boys, the experimental treatment was obviously significantly superior to the basal readers program in developing Auditory Discrimination skills.

TABLE 35

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN AUDITORY DISCRIMINATION FOR NEGRO SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Old				
Mean	20.1	45.4	61.0	67.4
σ	21.8	34.3	32.6	33.1
σ_M	3.1	4.8	4.6	4.7
95% Confidence	14.1	35.9	52.0	58.3
Interval Band	26.2	54.9	70.0	76.6
Cont. Negro Girls, Old				
Mean	21.9	40.9	54.7	59.6
σ	22.5	31.6	34.0	30.4
σ_M	3.2	4.5	4.9	4.3
95% Confidence	15.6	32.0	45.2	51.1
Interval Band	28.2	49.7	64.3	68.1
Exp. Negro Boys, Old				
Mean	16.2	34.6	53.3	66.7
σ	21.0	29.1	32.7	28.2
σ_M	3.4	4.7	5.3	4.6
95% Confidence	9.5	25.3	42.9	57.7
Interval Band	22.8	43.8	63.7	75.7
Cont. Negro Boys, Old				
Mean	18.1	25.4	31.8	43.3
σ	20.5	28.9	32.8	29.4
σ_M	3.3	4.6	5.3	4.7
95% Confidence	11.7	16.3	21.5	34.1
Interval Band	24.6	34.4	42.1	52.5



F ig. 33.--Growth curves of Negro subjects (old) in Auditory Discrimination.

In Auditory Discrimination there were no significant sex differences among old Negro subjects except in January when the control Negro girls (old) group surpassed the control Negro boys (old) group to a significant level.

Growth curves of Negro subjects (old) in Phonemes

The data in Table 36 and Figure 34 indicate that mean percentage gains in Phonemes made by the experimental old Negro girls and boys were rapid and significant from September to November, less rapid and almost significant from November to January, and nonsignificant from January to March.

The control Negro girls (old) also made significant improvement in Phonemes from September to November and nonsignificant gains within the rest of the two month testing intervals. The control Negro boys (old) also made regular improvement at each testing period but none was significant within any two month period.

No significant differences were found between the experimental and control treatments in the development of skills associated with Phonemes among old Negro girls. The control girls held and maintained their nonsignificant advantage over the experimental group from September through January. It was only in March that the experimental girls held the nonsignificant advantage. But the experimental treatment proved to be of marked and significant advantage in favor of the experimental old Negro boys. In September the nonsignificant difference was in favor of the control old Negro boys. In November the experimental group took the nonsignificant lead. At each of the January and March testing periods, the experimental Negro boys (old) excelled the control group with

TABLE 36

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN PHONEMES FOR NEGRO SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Old				
Mean	27.3	52.2	68.7	76.8
σ	22.3	34.2	33.9	29.9
σ_M	3.2	4.8	4.8	4.2
95% Confidence	21.2	42.7	59.3	68.5
Interval Band	33.5	61.7	78.0	85.1
Cont. Negro Girls, Old				
Mean	28.1	54.9	69.0	75.1
σ	23.3	33.2	27.8	25.2
σ_M	3.3	4.7	4.0	3.6
95% Confidence	21.5	45.6	61.2	68.0
Interval Band	34.6	64.2	76.7	82.1
Exp. Negro Boys, Old				
Mean	19.8	47.7	65.8	74.6
σ	20.1	32.5	29.2	29.3
σ_M	3.3	5.3	4.7	4.7
95% Confidence	13.4	37.4	56.5	65.3
Interval Band	26.2	58.0	75.1	83.9
Cont. Negro Boys, Old				
Mean	23.1	31.0	40.0	51.0
σ	19.6	26.9	30.8	34.3
σ_M	3.1	4.3	4.9	5.5
95% Confidence	16.9	22.5	30.3	40.2
Interval Band	29.2	39.4	49.7	61.8

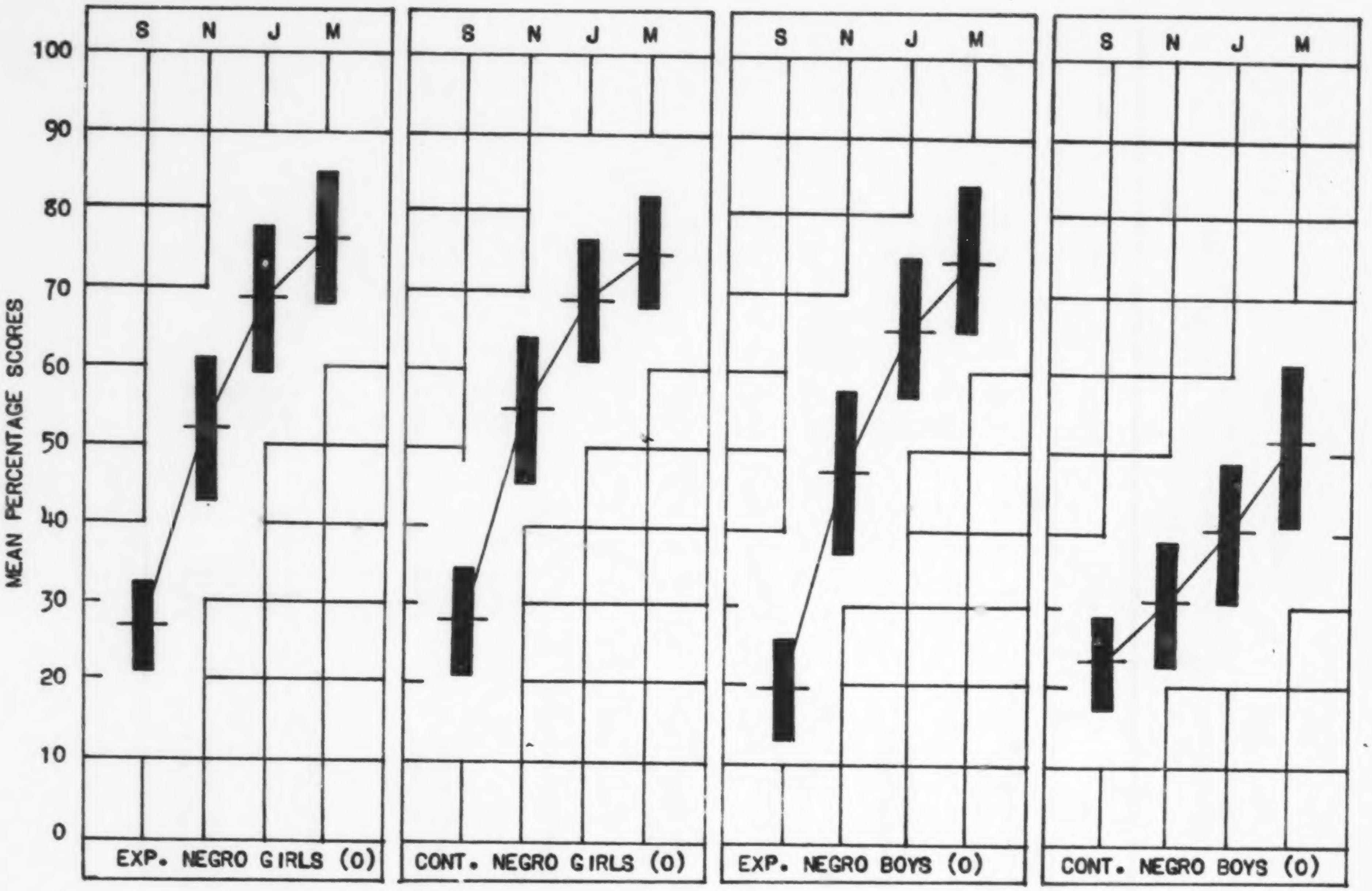


Fig. 34.--Growth curves of Negro subjects (old) in Phonemes.

differences which were statistically significant at the .05 level.

When specific and intensive reading readiness training was provided, no significant sex differences in Phonemes occurred as shown by the overlapping bands of the experimental old Negro girls with those of the experimental Negro boys (old) at each of the four testing periods. But when no specific and intensive reading readiness was provided, there were significant differences in favor of the girls. This was demonstrated by the fact that in September the bands of the control Negro girls (old) and control Negro boys (old) overlapped with the non-significant difference in favor of the girls but in November, January, and March, there were consistently significant differences in favor of the girls.

Growth curves of Negro subjects (old) in Word Meaning

As revealed by Table 37 and Figure 35, the experimental Negro girls (old) made gains in their mean percentage scores in Word Meaning that were almost significant from September to November, significant from November to January, and not significant from January to March. The experimental Negro boys (old) obtained significant gains from September to November as well as from November to January. Their increase from January to March was not significant.

The control old Negro girls as well as boys made continuous improvement from September through November but no gain was significant within any of the two month periods. It was interesting to note the extraordinarily wide confidence band of the control Negro girls (old) in November.

The experimental treatment was significantly superior to the

TABLE 37

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN WORD MEANING FOR NEGRO SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Old				
Mean	31.9	39.4	55.7	61.9
σ	13.1	15.1	19.9	16.0
σ_M	1.9	2.1	2.8	2.3
95% Confidence	28.2	35.2	50.2	57.4
Interval Band	35.5	43.6	61.3	66.3
Cont. Negro Girls, Old				
Mean	35.5	39.9	46.9	50.5
σ	14.2	33.0	17.5	15.7
σ_M	2.0	4.7	2.5	2.2
95% Confidence	31.5	30.7	42.0	46.1
Interval Band	39.4	49.2	51.8	54.9
Exp. Negro Boys, Old				
Mean	30.9	44.2	60.4	66.4
σ	12.4	10.7	18.1	14.1
σ_M	2.0	1.7	2.9	2.3
95% Confidence	27.0	40.8	54.6	62.0
Interval Band	34.9	47.7	66.1	70.9
Cont. Negro Boys, Old				
Mean	34.8	37.0	40.9	45.0
σ	16.4	13.0	14.0	15.2
σ_M	2.6	2.1	2.2	2.4
95% Confidence	29.6	32.9	36.5	40.3
Interval Band	39.9	41.1	45.2	49.8

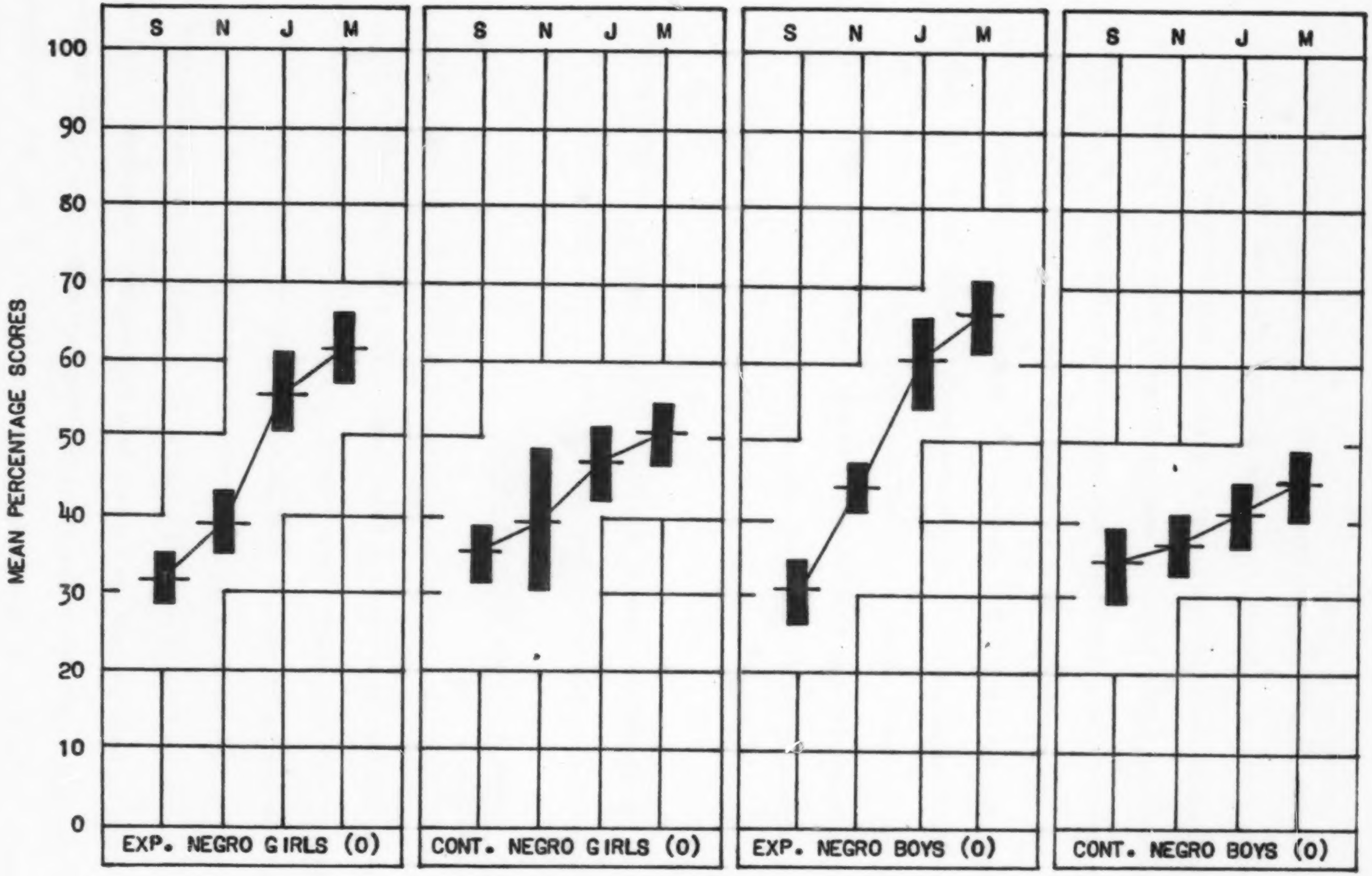


Fig. 35.--Growth curves of Negro subjects (old) in Word Meaning.

basal readers program in the development of Word Meaning skills among old Negro subjects. Among girls, the control group had the nonsignificant advantage over the experimental girls in September and November. In January the latter held the nonsignificant advantage. By March the experimental Negro girls (old) surpassed the control group by a difference that was statistically significant at the .05 level. With respect to boys, the nonsignificant advantage in September was in favor of the control old Negro boys. In November, the difference though not significant, was in favor of the experimental group. In January as well as March differences were statistically significant in favor of the experimental old Negro boys. In March the control Negro boys were still at a level comparable with that attained by the experimental group in November.

No significant sex differences in Word Meaning appeared among old Negro subjects under either treatment.

Growth curves of Negro subjects (old) in Listening

Table 38 and Figure 36 show that the experimental Negro girls (old) as well as experimental Negro boys (old) grew continuously in Listening from September through March. The gain they made within the first two months of reading readiness training was significant while that which they made within the other two month periods were not.

The control Negro girls (old) had a large but not significant increase in mean percentage scores from September to November. Gradual and nonsignificant decreases followed from September to January and from January to March. The extraordinarily wide limits of the 95% confidence

TABLE 38

MEAN PERCENTAGE SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND 95% CONFIDENCE INTERVAL BANDS IN LISTENING FOR NEGRO SUBJECTS (OLD)

	Sept.	Nov.	Jan.	Mar.
Exp. Negro Girls, Old				
Mean	49.5	62.4	67.9	72.6
σ	13.5	14.6	13.1	15.8
σ_M	1.9	2.1	1.8	2.2
95% Confidence	45.8	58.3	64.3	68.3
Interval Band	53.2	66.4	71.5	77.0
Cont. Negro Girls, Old				
Mean	52.3	68.7	68.0	67.9
σ	15.1	56.1	14.6	15.6
σ_M	2.2	8.0	2.1	2.2
95% Confidence	48.1	53.0	63.9	63.5
Interval Band	56.5	84.4	72.1	72.2
Exp. Negro Boys, Old				
Mean	45.4	57.7	67.3	69.6
σ	20.9	14.5	16.9	14.4
σ_M	3.4	2.3	2.7	2.3
95% Confidence	38.7	53.1	61.9	65.0
Interval Band	52.1	62.3	72.6	74.1
Cont. Negro Boys, Old				
Mean	48.9	56.7	58.2	62.3
σ	18.6	14.6	18.3	17.6
σ_M	3.0	2.3	2.9	2.8
95% Confidence	43.0	52.2	52.4	56.8
Interval Band	54.7	61.3	63.9	67.9

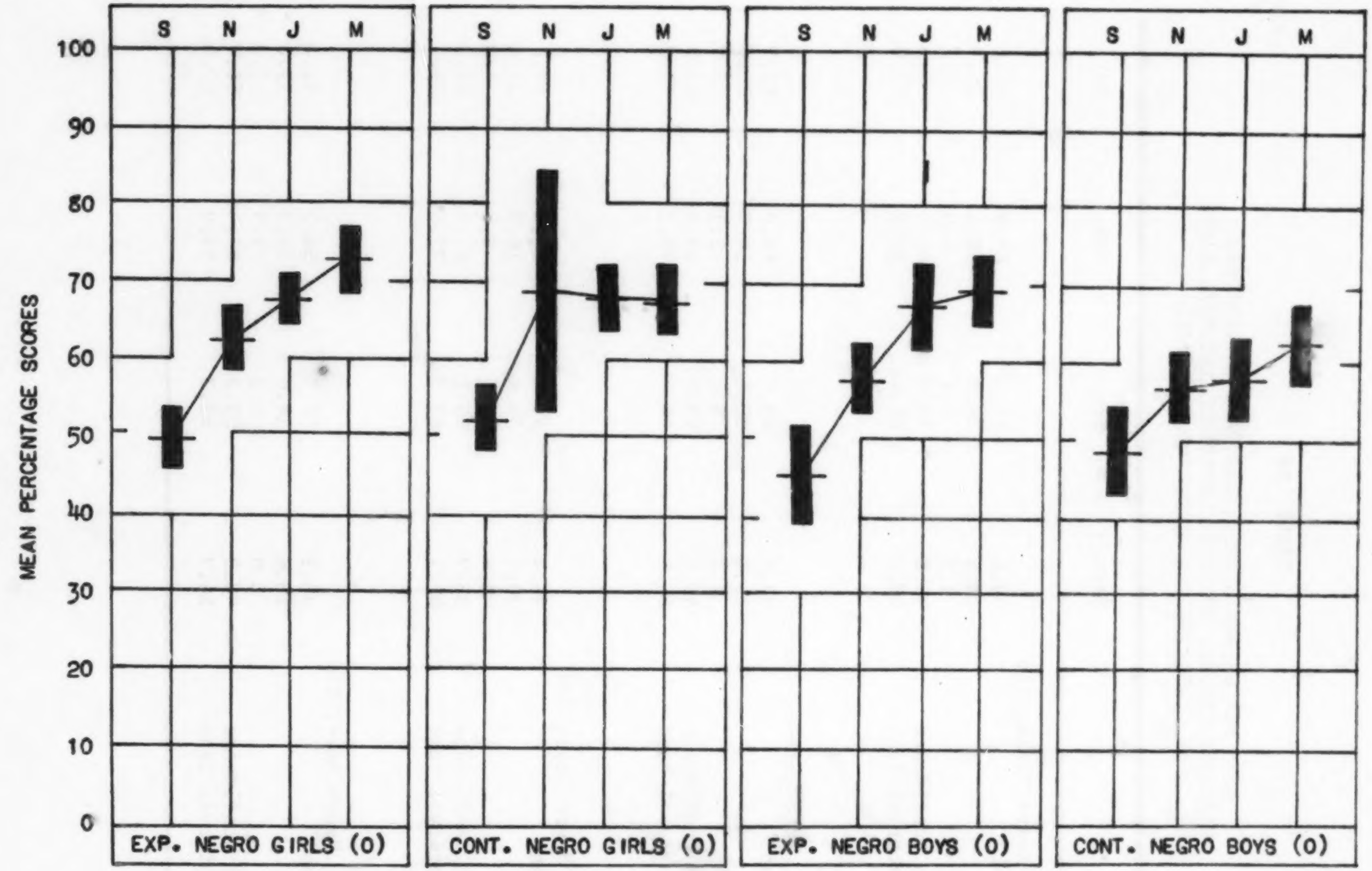


Fig. 36.--Growth curves of Negro subjects (old) in Listening.

interval of means for the control Negro girls (old) in November indicated a great dispersion of scores.

Significant differences between the experimental and control treatments in the development of Listening skills among old Negro subjects were not evident. Neither were significant sex differences in the development of Listening skills under either treatment evident among old Negro subjects.

Summary

1. Growth in Pattern Copying was continuous from September to March for ten of the twelve White experimental and control groups and subgroups. While growth was significant during each of the first and second two-month training periods for the experimental groups, it was significant only during the second two-month formal reading period for the control White groups.

Growth in Identical Forms was continuous from September to March for all of the twelve White groups and subgroups. Growth was significant within the first two months then gradually became non-significant for all of the six experimental groups and for one control group.

Growth in Auditory Discrimination was continuous from September to March for all White groups, experimental and control. All twelve groups had significant growth within the first two months. Four of the six experimental groups had additional significant gain within the succeeding two-month training periods but only two of the control groups did.

Growth in Phonemes among White subjects was continuous from

September to March for all groups. It was significant from September to November for all twelve groups.

Growth in Word Meaning was continuous from September to March for all twelve White groups. It was significant from September to November for five of the six experimental groups and for half of the control groups. It was also significant from November to January for all of the six experimental groups and for none of the control groups.

Growth in Listening was continuous from September to March for all twelve White groups. It was significant during the first two months for all six experimental groups and for five control groups.

2. Growth in Pattern Copying was continuous from September to March for all twelve Negro groups. It was significant from September to November and from November to January for five of the six experimental groups. It was significant from November to January for five of the control groups.

Growth in Identical Forms was significant from September to November and from November to January for all Negro experimental groups. A significant gain was made by all control groups from September to November.

Growth in Auditory Discrimination was continuous from September to March for all Negro groups. Significant growth was made from September to November by all experimental Negro groups and for five control groups; significant also from November to January for four experimental groups and for two control groups.

Growth in Phonemes was continuous from September to March for all experimental and control Negro groups. It was significant from September to November for all experimental groups and for four control groups. It was significant from November to January for three experimental groups and for two control groups.

Growth in Word Meaning was continuous for all of the twelve Negro groups from September to March. Growth was significant from September to November for five experimental groups; from November to January for all experimental groups; from January to March for two experimental groups and one control group.

Growth in Listening was continuous from September to March for for all experimental groups. It was significant from September to November for all experimental groups and for four control groups. It was also significant from November to January for three experimental groups.

3. The experimental treatment was significantly superior to the basal readers program in the development of Pattern Copying skills among White subjects, particularly within the first two months of training. This was also true of the development of skills measured by Identical Forms within the first two months for White groups, and within the first four months for Negro groups.

The experimental treatment was equivalent to the basal readers program in developing Auditory Discrimination skills, except for young White girls and, consequently, White girls for whom the experimental treatment was significantly superior within the first two months.

The experimental treatment was equivalent to the basal readers program in developing Phonemes skills among White subjects.

The experimental treatment was significantly superior to the basal readers program in developing Word Meaning skills among White subjects after four months of training, except in the case of the young girls, for whom the treatment made no difference.

The experimental treatment in Listening was significantly superior to the basal readers program for two major groups and two age groups from November to January. For the remaining groups, treatment made no difference.

4. The experimental treatment was significantly superior to the control treatment in developing Pattern Copying skills among all Negro groups.

It was significantly superior to the control treatment in developing Identical Forms skills, particularly during the first four months of training, except in the case of old Negro boys, for whom the treatments were equally effective.

The experimental treatment was equivalent to the control treatment in developing Auditory Discrimination skills, except for experimental Negro boys (old) and, consequently, experimental Negro boys who surpassed the control groups significantly within the last two months of training.

The experimental treatment was equivalent to the control treatment in developing skills associated with Phonemes, except for the experimental Negro boys (old) and, consequently, for the experimental Negro boys as a whole who made significantly higher scores than the control groups.

The experimental treatment was significantly superior to the basal readers program in developing Word Meaning skills within the last four months for four Negro groups and within the last two months for two Negro groups.

The experimental treatment was as effective as the basal readers program in developing Listening skills among Negro subjects.

5. Among the White subjects there were no significant sex differences in any of the test variables, except in Word Meaning in which the experimental White boys displayed superiority to the experimental White girls in November and January.

Among the Negro subjects, no significant sex differences in Pattern Copying and Word Meaning were evident.

The only significant sex differences in Identical Forms were shown by the experimental Negro girls (young) who were significantly superior to the experimental young Negro boys in November, and by the total experimental Negro girls' group who were superior to the total Negro boys' group in November and January.

In Auditory Discrimination, there were no significant sex differences when training in reading readiness was provided. In the basal readers program, significant differences were in favor of the control Negro girls in November, January, and March and significantly in favor of control Negro girls (old) in January.

For the control treatment, there were significant differences between sexes in Phonemes in favor of the control Negro girls in November, January, and March, in favor of the control Negro girls (young) in January and March, and in favor of the control Negro girls (old) from November through March. Among the experimental subjects there was a significant superiority of the young Negro girls to the young Negro boys in November.

There were no significant differences in Listening associated with sex among Negro subjects, except for control Negro girls, who were superior to the control Negro boys in January.

6. There were no significant differences between young and old

subjects in Pattern Copying, Auditory Discrimination, Phonemes, and Word Meaning.

In Identical Forms the only age differences occurred in March when the experimental White boys (old) were significantly superior to the experimental White boys (young). In Listening the only significant difference occurred in March and favored the control White boys.

For Negro subjects there were no significant differences associated with age in performance on Auditory Discrimination, Phonemes, Word Meaning, and Listening.

The only significant age differences in Pattern Copying occurred in March and favored the experimental old Negro boys. In Identical Forms the only difference occurred in January and favored the experimental old Negro boys.

CHAPTER V

RESULTS AND DISCUSSION: FACTOR PATTERN CHANGES

At the beginning of the study, it was anticipated that out of the six reading readiness subtests, three factors would be extracted, namely: (a) visual discrimination, which would be characterized by high loadings of the Pattern Copying and of the Identical Forms tests; (b) auditory discrimination, which would be defined by high loadings of the Auditory Discrimination and Phonemes subtests; and (c) auditory language ability, that would be distinguished by high loadings of the Word Meaning and Listening subtests. Factor loadings of .500 and above were considered high.

When the data were factor analyzed, the anticipated visual discrimination factor did not emerge, except in three instances. There turned out to be two specific factors, one on which Pattern Copying loaded high and the other on which Identical Forms loaded high. Evidently the two tests measured two different factors identified by Goins (1958) and by French (1951) as strength of closure and speed of perception. The two other anticipated factors, auditory discrimination and auditory language ability, were clearly indicated by the factor analyses.

The rotated factor matrices for each of the White groups and subgroups in September, November, January, and March are presented in Tables 39 to 42 and in Tables 47 to 54. Those for Negro subjects are presented in Tables 43 to 46 and in Tables 55 to 62. Factor loadings with values $\geq$ .500 were the only ones indicated in the tables. All factor loadings lower than .500 were considered to be more or less error variances or variances unaccounted for. They were represented by X's on each of the tables in order to facilitate the inspection and analysis of the data. The complete rotated factor matrices are embodied in the larger study files.

The factor matrices were analyzed visually and the discussion of results centered on the description of the emergence and/or change of factors and factor patterns in reading readiness for each of the White and Negro groups and subgroups.

Factor patterns for experimental White girls

Table 39 indicates that for experimental White girls the first factor in September was a specific factor, strength of closure, as shown by the high factor loading of only the Pattern Copying test. This factor showed up at each of the four testing periods with consistently high loadings ranging from .929 to .961. It loaded highest in November, then gradually and slightly declined.

The only test that loaded high on the second factor in September was Identical Forms. Obviously, it was the speed of perception factor which ran through all the testing periods with relatively high loadings ranging from .916 to .965. Gradually increasing in loading from September, it reached its maximum in January, then decreased slightly in March.

The Auditory Discrimination subtest was the third specific factor in September. In November it shared variance with Phonemes and

TABLE 39

ROTATED FACTOR MATRICES FOR EXP. WHITE GIRLS
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.955	X	X	X
Identical Forms	X	.916	X	X
Auditory Disc.	X	X	.824	X
Phonemes	X	X	X	.760
Word Meaning	X	X	X	.829
Listening	X	X	X	.587
November				
Pattern Copying	.961	X	X	X
Identical Forms	X	.921	X	X
Auditory Disc.	X	X	.841	X
Phonemes	X	X	.855	X
Word Meaning	X	X	X	.948
Listening	X	X	.655	X
January				
Pattern Copying	.959	X	X	X
Identical Forms	X	.965	X	X
Auditory Disc.	X	X	.832	X
Phonemes	X	X	.867	X
Word Meaning	X	X	X	.896
Listening	X	X	X	.697
March				
Pattern Copying	.929	X	X	X
Identical Forms	X	.956	X	X
Auditory Disc.	X	X	.850	X
Phonemes	X	X	.824	X
Word Meaning	X	X	X	.826
Listening	X	X	X	.732

Listening to make up what was probably an auditory-comprehension factor. The emergence of the hypothesized auditory discrimination factor occurred in January when both the Auditory Discrimination and Phonemes subtests had high loadings. This factor seemed to be stable through March.

High loadings on Phonemes, Word Meaning, and Listening in September defined what probably was an auditory-comprehension factor. This combination split up in November leaving Word Meaning as a specific factor. In January Word Meaning and Listening shared variance with each other to indicate clearly an auditory-language factor. This factor was stable through March.

The factor pattern for experimental White girls started out in September with three specific factors (strength of closure, speed of perception, and Auditory Discrimination) and an auditory-comprehension factor.

In November, the strength of closure factor reached the height of its importance while speed of perception continued to increase its factor loading. An auditory-comprehension factor emerged while Word Meaning became a specific factor.

The importance of the strength of closure factor started to decline in January when the speed of perception factor reached its highest. The two anticipated factors, auditory discrimination and auditory language ability, then emerged. This January factor pattern was stable through March but with slightly diminishing loadings.

It is worthy to note that among experimental White girls, the strength of closure and speed of perception factors appeared at the same time and prior to the auditory discrimination and auditory language factors. Comparison of the factor patterns at different testing periods revealed that the auditory-comprehension factor preceded the auditory discrimination and auditory language factors.

Factor patterns for experimental White boys

As shown by the data presented in Table 40, the first factor in September for experimental White boys was probably a visual-auditory factor which involved high loadings on Pattern Copying and Phonemes. This combination split, leaving Pattern Copying the only highly loaded test on the first factor from November through March. Its period of greatest importance was in November.

What was probably a visual-comprehension factor emerged as the second factor in September. It loaded high on the Identical Forms and Listening tests. When this factor split in November, the speed of perception factor emerged and became stable through March. Its maximum loading occurred in March.

The auditory discrimination factor emerged in September with high loadings on the Auditory Discrimination and Phonemes tests, though Phonemes also contributed more than half its variance to the first factor (visual-auditory factor). The auditory discrimination factor was stable at all of the four testing periods. It increased in importance gradually, reaching its peak in January then slightly declining in March.

Word Meaning was a specific factor in September. When it shared variance with Listening in November, the auditory language factor emerged and became stable through March. Its greatest importance was in January, when its loading was highest.

TABLE 40

ROTATED FACTOR MATRICES FOR EXP. WHITE BOYS IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.880	X	X	X
Identical Forms	X	.862	X	X
Auditory Disc.	X	X	.933	X
Phonemes	.585	X	.523	X
Word Meaning	X	X	X	.851
Listening	X	.764	X	X
November				
Pattern Copying	.977	X	X	X
Identical Forms	X	.931	X	X
Auditory Disc.	X	X	.923	X
Phonemes	X	X	.790	X
Word Meaning	X	X	X	.772
Listening	X	X	X	.779
January				
Pattern Copying	.966	X	X	X
Identical Forms	X	.928	X	X
Auditory Disc.	X	X	.878	X
Phonemes	X	X	.887	X
Word Meaning	X	X	X	.883
Listening	X	X	X	.707
March				
Pattern Copying	.920	X	X	X
Identical Forms	X	.981	X	X
Auditory Disc.	X	X	.782	X
Phonemes	X	X	.937	X
Word Meaning	X	X	X	.815
Listening	X	X	X	.777

The factor pattern in September for experimental White boys seemed to indicate the importance of the visual-auditory, visual-comprehension, auditory discrimination, and word meaning factors during the early period of training.

In November, the factor pattern consisted in the strength of closure, speed of perception, auditory discrimination, and auditory language factors, which pattern persisted through March. The strength of closure factor reached its greatest importance in November, the speed of perception factor in March, the auditory discrimination factor in January, and the auditory language factor in January.

As indicated by the factor patterns at the different testing periods for the experimental White boys, the visual-auditory and visual-comprehension factors showed great importance before the emergence of the strength of closure and speed of perception factors. The _Word Meaning_ specific factor also preceded the auditory language factor. The auditory language factor emerged later than the auditory discrimination factor.

Factor patterns for control White girls

Table 41 shows that for the control White girls, the strength of closure factor was stable from September through March. Its highest loading was in November. Then it slowly and gradually decreased through March.

The speed of perception factor likewise appeared as a stable factor at each of the four testing periods with consistently high loadings. It started with a high loading of .956 in September, diminished slightly in November, then reached its maximum in January when it was

TABLE 41

ROTATED FACTOR MATRICES FOR CONT. WHITE GIRLS IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.930	X	X	X
Identical Forms	X	.956	X	X
Auditory Disc.	X	X	.905	X
Phonemes	X	X	.728	X
Word Meaning	X	X	X	.721
Listening	X	X	X	.908
November				
Pattern Copying	.983	X	X	X
Identical Forms	X	.951	X	X
Auditory Disc.	X	X	.875	X
Phonemes	X	X	.878	X
Word Meaning	X	X	.520	X
Listening	X	X	X	.959
January				
Pattern Copying	.972	X	X	X
Identical Forms	X	.992	X	X
Auditory Disc.	X	X	.932	X
Phonemes	X	X	.852	X
Word Meaning	X	X	X	.805
Listening	X	X	X	.896
March				
Pattern Copying	.941	X	X	X
Identical Forms	X	.949	X	X
Auditory Disc.	X	X	.894	X
Phonemes	X	X	.856	X
Word Meaning	X	X	X	.681
Listening	X	X	X	.907

an almost pure specific factor with a loading of .992. In March it reduced in its loading slightly.

The auditory discrimination factor showed up early in September. In November it shared variance with Word Meaning to make up what probably was an auditory-comprehension factor. In January and March the auditory discrimination factor reappeared. Its period of greatest importance was in January.

The fourth factor in September was a clear auditory language factor as shown by the high factor loadings on the Word Meaning and Listening tests. When Word Meaning shared variance with the Auditory Discrimination and Phonemes tests in November, Listening was left as a specific factor. Word Meaning and Listening merged again in January and became stable through March. Its greatest importance was in January.

The factor pattern for control White girls in September was made up of the strength of closure, speed of perception, auditory discrimination, and auditory language factors.

In November the strength of closure factor increased and reached its maximum importance while the speed of perception factor decreased negligibly. The auditory discrimination factor merged with Word Meaning making up an auditory-comprehension factor while Listening stood by itself as a specific factor.

A slight reduction in factor loading for Pattern Copying came in January, while Identical Forms reached its maximum level. The auditory discrimination and auditory language factors were of greatest importance in January.

The factor pattern for March was essentially the same as that for January, but with small reduction on each of the factors.

While the four factors (strength of closure, speed of perception, auditory discrimination, and auditory language) emerged at the same time in September for control White girls, the first two were stable through March, while the last two showed stability only from January through March.

Factor patterns for control White boys

The data in Table 42 show that for control White boys, the first factor in September was obviously strength of closure as evidenced by the high factor loading of the Pattern Copying test. This factor appeared at each of the four testing periods with the highest loading in September and the lowest in January.

Also manifesting itself early in September was the speed of perception factor defined by a high loading in Identical Forms. It maintained its stability from September through March, and had its highest loading in November.

The auditory discrimination factor had its greatest importance in September. Its importance slowly and slightly waned through January. In March it shared variance with the Word Meaning test which was also contributing more than half its variance to the auditory language factor.

Stability was likewise demonstrated by the auditory language factor, for it appeared at all of the four testing periods. Its greatest importance was in November.

The factor pattern for September was practically carried over from testing to testing period except in March, when the auditory discrimination factor merged with the Word Meaning test.

TABLE 42

ROTATED FACTOR MATRICES FOR CONT. WHITE BOYS IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.978	X	X	X
Identical Forms	X	.958	X	X
Auditory Disc.	X	X	.898	X
Phonemes	X	X	.812	X
Word Meaning	X	X	X	.623
Listening	X	X	X	.917
November				
Pattern Copying	.967	X	X	X
Identical Forms	X	.988	X	X
Auditory Disc.	X	X	.922	X
Phonemes	X	X	.676	X
Word Meaning	X	X	X	.846
Listening	X	X	X	.824
January				
Pattern Copying	.926	X	X	X
Identical Forms	X	.975	X	X
Auditory Disc.	X	X	.839	X
Phonemes	X	X	.807	X
Word Meaning	X	X	X	.725
Listening	X	X	X	.904
March				
Pattern Copying	.944	X	X	X
Identical Forms	X	.978	X	X
Auditory Disc.	X	X	.853	X
Phonemes	X	X	.839	X
Word Meaning	X	X	.518	.687
Listening	X	X	X	.883

The factor patterns for control White boys showed that while the strength of closure factor had its greatest importance, the speed of perception factor had its least. Auditory discrimination also reached its height of importance in September, while auditory language ability had its lowest.

The November factor pattern revealed the strength of closure factor slowly decreasing in importance, while the speed of perception factor attained its maximum. The auditory discrimination had its least importance, while the auditory language factor had its greatest.

January found all the factors decreasing in importance except auditory discrimination, which gained in importance.

The factors in March were essentially the same though the strength of closure and speed of perception factors increased slightly in importance, the auditory language factor slightly decreased, and the auditory discrimination factor was bolstered by *Word Meaning*.

Factor patterns for experimental Negro girls

Table 43 reveals the factor patterns in reading readiness among experimental Negro girls. *Pattern Copying* came out as a specific factor in September, merged with *Word Meaning* in November, then stabilized from January through March.

Identical Forms merged with Auditory Discrimination in September, with *Pattern Copying* in November, then stabilized as a specific factor in January and in March.

Phonemes shared variance with *Word Meaning* in September to make up what was probably an auditory-comprehension factor. As instruction continued this combination split up. *Word Meaning* merged with *Pattern*

TABLE 43

ROTATED FACTOR MATRICES FOR EXP. NEGRO GIRLS
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.977	X	X	X
Identical Forms	X	.872	X	X
Auditory Disc.	X	.853	X	X
Phonemes	X	X	.780	X
Word Meaning	X	X	.845	X
Listening	X	X	X	.939
November				
Pattern Copying	.621	.595	X	X
Identical Forms	X	.862	X	X
Auditory Disc.	X	X	.883	X
Phonemes	X	X	.867	X
Word Meaning	.846	X	X	X
Listening	X	X	X	.880
January				
Pattern Copying	.885	X	X	X
Identical Forms	X	.988	X	X
Auditory Disc.	X	X	.754	X
Phonemes	X	X	.882	X
Word Meaning	X	X	.585	X
Listening	X	X	X	.947
March				
Pattern Copying	.969	X	X	X
Identical Forms	X	.973	X	X
Auditory Disc.	X	X	.892	X
Phonemes	X	X	.843	X
Word Meaning	X	X	X	.728
Listening	X	X	X	.918

Copying, while Phonemes merged with Auditory Discrimination to give rise to the auditory discrimination factor. In January the auditory discrimination factor was augmented by Word Meaning sharing in variance. In March the auditory discrimination factor was again defined by the two tests as initially anticipated.

The Listening test was a specific factor from September through January. Not until March did it load high with Word Meaning to define the auditory language factor.

The September factor pattern for experimental Negro girls involved specific factors defined by high loadings in Pattern Copying and in Listening, a factor combination of Identical Forms and Auditory Discrimination, and another combination, that of Phonemes and Word Meaning.

As training in reading readiness progressed up to November, Pattern Copying split its variance, about half of which merged with Word Meaning and the other half with Identical Forms. The auditory discrimination factor appeared with high loadings on Auditory Discrimination and Phonemes while Listening remained a specific factor.

By January the strength of closure factor, characterized by a high loading on Pattern Copying, reappeared while the speed of perception factor emerged. The auditory discrimination factor shared variance with Word Meaning, while Listening still held up as a specific factor.

At the end of the training period the factor pattern was clearly made up of the strength of closure, speed of perception, auditory discrimination, and auditory language factors.

The factor patterns for experimental Negro girls show that the strength of closure factor emerged ahead of the speed of perception factor but both seemed to stabilize at the same time. The auditory discrimination factor also emerged earlier than the auditory language factor and seemed to be more stable.

Factor patterns for experimental Negro boys

As indicated by Table 44, the strength of closure factor was a constant and a highly loaded factor from September through March for the experimental Negro boys. Its highest loading was in January and its lowest was in March.

The speed of perception factor, defined by a high loading in Identical Forms, emerged in September. It shared its variance with Listening in November but became a stable factor in January and March. Its largest loading occurred in March.

At all the testing periods auditory discrimination was another constant factor as shown by consistently high loadings of the Auditory Discrimination and Phonemes tests. In September Phonemes split its variance between the third factor, auditory discrimination, and the fourth factor, auditory language. In November, Phonemes again contributed about half its variance to the third factor and the other half to the fourth factor. From January through March the auditory discrimination factor fully stabilized. In January it had its highest loading.

The fourth factor in September consisted in such highly loaded tests as Phonemes, Word Meaning, and Listening, to make up what was probably an auditory-comprehension factor. As training in reading readiness continued, the auditory language factor appeared and stabilized between November and March. Its period of greatest importance was in January.

TABLE 44

ROTATED FACTOR MATRICES FOR EXP. NEGRO BOYS IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.953	X	X	X
Identical Forms	X	.885	X	X
Auditory Disc.	X	X	.912	X
Phonemes	X	X	.505	.589
Word Meaning	X	X	X	.741
Listening	X	X	X	.838
November				
Pattern Copying	.953	X	X	X
Identical Forms	X	.714	X	X
Auditory Disc.	X	X	.908	X
Phonemes	X	X	.715	.511
Word Meaning	X	X	X	.842
Listening	X	.804	X	X
January				
Pattern Copying	.962	X	X	X
Identical Forms	X	.963	X	X
Auditory Disc.	X	X	.918	X
Phonemes	X	X	.775	X
Word Meaning	X	X	X	.783
Listening	X	X	X	.868
March				
Pattern Copying	.936	X	X	X
Identical Forms	X	.965	X	X
Auditory Disc.	X	X	.871	C
Phonemes	X	X	.786	X
Word Meaning	X	X	X	.767
Listening	X	X	X	.864

The factor pattern for experimental Negro boys in September was marked by the strength of closure, speed of perception, and auditory discrimination factors, and what appeared to be an auditory-comprehension factor.

After two months of reading readiness training, the strength of closure and auditory discrimination factors were still intact; the first was stationary in variance; and the second slightly increased. The Identical Forms test, which was specific in September, shared variance with Listening in November. The fourth factor was then a combination of the Phonemes and Word Meaning tests, probably an auditory-comprehension factor.

By January all the four factors (strength of closure, speed of perception, auditory discrimination, and auditory language) became distinct. Although stable through March, their loadings decreased slightly from January to March except, in the case of the speed of perception factor which had a slight increase.

As demonstrated by the factor patterns for experimental Negro boys, though the strength of closure and speed of perception factors appeared in September, the former exhibited greater stability. Not only did the auditory discrimination factor emerge earlier but it also stabilized earlier than the auditory language factor.

Factor pattern changes for control Negro girls

The data in Table 45 report factor patterns in reading readiness for the control Negro girls. At the early part of the formal reading instruction program, the first factor was something like a visual-auditory factor on which Pattern Copying and Phonemes loaded high. In

TABLE 45

ROTATED FACTOR MATRICES FOR CONT. NEGRO GIRLS
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.836	X	X	X
Identical Forms	X	.946	X	X
Auditory Disc.	X	X	.985	X
Phonemes	.866	X	X	X
Word Meaning	X	X	X	.960
Listening	X	.502	X	X
November				
Pattern Copying	.989	X	X	X
Identical Forms	X	.982	X	X
Auditory Disc.	X	X	.948	X
Phonemes	X	X	.734	X
Word Meaning	X	X	X	.951
Listening	X	X	X	.954
January				
Pattern Copying	.965	X	X	X
Identical Forms	X	.564	X	X
Auditory Disc.	X	X	.893	X
Phonemes	X	X	.794	X
Word Meaning	X	.950	X	X
Listening	X	X	X	.906
March				
Pattern Copying	.975	X	X	X
Identical Forms	X	.943	X	X
Auditory Disc.	X	X	.910	X
Phonemes	X	X	.747	X
Word Meaning	X	X	X	.870
Listening	X	X	X	.823

November Pattern Copying split from Phonemes and became a specific factor during the remainder of the study. Its greatest importance was manifested in November.

The Identical Forms test started out in September in combination with the Listening test to define what was probably a visual-comprehension factor. In November the two tests separated and the former became a specific factor. By January the Identical Forms test became unstable again and that time shared variance with Word Meaning to make up what was probably a visual-comprehension factor. As reading instruction continued the speed of perception factor reappeared in March.

The Auditory Discrimination test defined a specific factor in September. Then in November the auditory discrimination factor emerged. This factor was stable from November through March. Its highest loading was in November then it slowly and slightly decreased at each testing period.

The Word Meaning test also defined a specific factor in September. In November it shared variance with the Listening test, thus giving rise to the auditory language factor. However, in January the Word Meaning test shared variance with Identical Forms, while Listening became a specific factor. The auditory language factor made its reappearance in March.

The control Negro girls' factor patterns reveal that at the early part of the basal reading period, the visual-auditory, visual-comprehension, Auditory Discrimination, and Word Meaning factors were important. As reading experiences increased, the strength of closure, speed of perception, auditory discrimination, and auditory language factors were of great importance. By January the strength of closure factor and auditory discrimination factor decreased slightly in importance. The *Identical Forms* test and the *Word Meaning* test shared variance while the *Listening test* became a specific factor. After this period of instability, the four factors (strength of closure, speed of perception, auditory discrimination, and auditory language) reappeared in the factor pattern. It is interesting to note that among control Negro girls, the strength of closure factor stabilized earlier than the speed of perception factor and that the auditory discrimination factor stabilized earlier than did the auditory language factor.

Factor patterns for control Negro boys

Table 46 shows that for the control Negro boys, the first factor which emerged at the first testing period was strength of closure, defined by a high loading on *Pattern Copying*. At each of the testing periods it exhibited great stability and high loadings ranging from .933 to .984. After reaching its period of maximum loading in November, its importance gradually and slightly decreased.

The second factor in which the *Identical Forms* test shared variance with *Word Meaning* and *Listening* was probably a visual-comprehension factor. In November *Word Meaning* broke away from the combination and became a specific factor. As formal reading instruction progressed, *Word Meaning* merged again with *Identical Forms* while *Listening* became a specific factor in January. With further formal reading instruction, the *Identical Forms* test was a specific factor in March. Thus the speed of perception factor emerged only in March.

The third factor in September was a specific factor on which the *Auditory Discrimination* test loaded high. In November this test shared

TABLE 46

ROTATED FACTOR MATRICES FOR CONT. NEGRO BOYS IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.979	X	X	X
Identical Forms	X	.861	X	X
Auditory Disc.	X	X	.953	X
Phonemes	X	X	X	.901
Word Meaning	X	.733	X	X
Listening	X	.654	X	.533
November				
Pattern Copying	.984	X	X	X
Identical Forms	X	.710	X	X
Auditory Disc.	X	X	.903	X
Phonemes	X	X	.778	X
Word Meaning	X	X	X	.949
Listening	X	.876	X	X
January				
Pattern Copying	.965	X	X	X
Identical Forms	X	.801	X	X
Auditory Disc.	X	X	.897	X
Phonemes	X	X	.820	X
Word Meaning	X	.898	X	X
Listening	X	X	X	.967
March				
Pattern Copying	.933	X	X	X
Identical Forms	X	.902	X	X
Auditory Disc.	X	X	.673	X
Phonemes	X	X	.884	X
Word Meaning	X	X	X	.686
Listening	X	X	X	.855

variance with Phonemes giving rise to the auditory discrimination factor which remained stable through March. Its highest loading was in January.

The fourth factor in September was probably an auditory-comprehension factor since the Phonemes and Listening tests had high loadings. As formal reading progressed, Listening merged with Identical Forms in November, while Word Meaning became a specific factor. In January, Word Meaning merged with Identical Forms, while Listening became a specific factor. Not until March did the auditory language factor emerge.

For control Negro boys, the factor pattern in September was made up of the strength of closure factor, the Auditory Discrimination test as a specific factor, an auditory-comprehension factor, and a visual-comprehension factor. In November, the strength of closure factor was stable, the auditory discrimination factor emerged, the visual-comprehension factor was still important, and the Word Meaning specific factor appeared. While the strength of closure and auditory discrimination factors were stable in January, the visual-comprehension factor was still important and Listening was a specific factor. In March, clean factors for the strength of closure, speed of perception, auditory discrimination, and auditory language appeared.

The strength of closure factor appeared and stabilized the earliest. The auditory discrimination factor emerged earlier than the auditory language factor. The visual-comprehension factor preceded the speed of perception factor, and the specific factors for Word Meaning and Listening preceded the auditory language factor.

Factor patterns for experimental White girls (young)

Table 47 discloses the emergence and change of factor patterns in reading readiness among experimental White girls (young). The first factor in September was strength of closure characterized by a high loading of the Pattern Copying test. The loading was highest in September, diminished gradually through January, then increased slightly in March.

A visual-auditory factor was probably the second factor in September as there were high loadings of the Identical Forms and Phonemes tests. When this combination separated in November, the Identical Forms test became a specific factor. In January it combined with Word Meaning to make up what was probably a visual-comprehension factor. As reading readiness training continued, the Identical Forms test was again a specific factor defined as the speed of perception factor.

The third factor in September was probably an auditory-comprehension factor as shown by the high loadings of the Auditory Discrimination and Word Meaning tests. As reading readiness instruction progressed, there appeared a combination of high loadings of the Auditory Discrimination, Phonemes, and Listening tests in November and another combination of Identical Forms - Auditory Discrimination tests in January. In January the clear auditory discrimination factor emerged.

The auditory language factor defined by high loadings of the Word Meaning and Listening tests manifested itself early in September. This split up and was left as a Word Meaning factor in November and as a Listening specific factor in January. It was in March when the auditory language factor reappeared.

TABLE 47

ROTATED FACTOR MATRICES FOR EXP. WHITE GIRLS, (YOUNG) IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.988	X	X	X
Identical Forms	X	.835	X	X
Auditory Disc.	X	X	.932	X
Phonemes	X	.812	X	X
Word Meaning	X	X	.546	.623
Listening	X	X	X	.894
November				
Pattern Copying	.966	X	X	X
Identical Forms	X	.872	X	X
Auditory Disc.	X	X	.876	X
Phonemes	X	X	.814	X
Word Meaning	X	X	X	.941
Listening	X	X	.704	X
January				
Pattern Copying	.921	X	X	X
Identical Forms	X	.500	.665	X
Auditory Disc.	X	X	.840	X
Phonemes	X	X	.824	X
Word Meaning	X	.920	X	X
Listening	X	X	X	.919
March				
Pattern Copying	.942	X	X	X
Identical Forms	X	.947	X	X
Auditory Disc.	X	X	.831	X
Phonemes	X	X	.841	X
Word Meaning	X	X	X	.860
Listening	X	X	X	.765

September's factor pattern for experimental White girls (young) consisted in the strength of closure, auditory language, visual-auditory, and auditory-comprehension factors. In November the strength of closure factor was stable while the speed of perception factor emerged. There appeared an auditory-comprehension factor as well as a specific factor, Word Meaning. In January the strength of closure factor remained stable. The visual-comprehension, visual-auditory, and specific Listening factors emerged. By March the strength of closure, speed of perception, auditory discrimination, and auditory language factors represented the factor patterns for experimental White girls (young).

The strength of closure factor seemed to be the most stable and the earliest to emerge among the factors. Although the auditory language factor came out early, it was as unstable as the other two factors. Not until March did young experimental White girls appear to show a factor pattern similar to that of other groups.

Factor patterns for experimental White girls (old)

As seen in Table 48, high loadings in Pattern Copying from September through March defined a clear and stable strength of closure factor among the old experimental White girls. The highest loading in Pattern Copying occurred in November, decreased slightly in January, then increased again in March.

There was a combination of high loadings of the Identical Forms and Listening tests to suggest what was probably a visual-comprehension factor in September as well as in November. The separation of this combination in January gave rise to an almost perfectly pure specific factor in speed of perception as shown by the loading of .997 in Identical

TABLE 48

ROTATED FACTOR MATRICES FOR EXP. WHITE GIRLS (OLD)
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.922	X	X	X
Identical Forms	X	.844	X	X
Auditory Disc.	X	X	.870	X
Phonemes	X	X	X	.826
Word Meaning	X	X	X	.852
Listening	X	.758	X	X
November				
Pattern Copying	.960	X	X	X
Identical Forms	X	.947	X	X
Auditory Disc.	X	X	.820	X
Phonemes	X	X	.918	X
Word Meaning	X	X	X	.952
Listening	X	.533	X	X
January				
Pattern Copying	.896	X	X	X
Identical Forms	X	.997	X	X
Auditory Disc.	X	X	.704	X
Phonemes	X	X	.936	X
Word Meaning	X	X	X	.886
Listening	X	X	X	.761
March				
Pattern Copying	.926	X	X	X
Identical Forms	X	.795	X	X
Auditory Disc.	X	X	.606	X
Phonemes	X	X	.855	X
Word Meaning	X	X	X	.907
Listening	X	X	.859	X

Forms. However this loading reduced drastically to .795 in March.

Auditory Discrimination was a specific factor in September. In November it shared variance with Phonemes giving rise to an auditory discrimination factor which was stable through January. In March, the auditory discrimination factor's variance was shared by the Listening test.

Shared variance between the Phonemes and Word Meaning tests was high in September which indicated what was probably an auditory-comprehension factor. As the auditory discrimination factor appeared in November through the mergence of the Auditory Discrimination and Phonemes tests' variances, Word Meaning was left alone as a specific factor. In January both the Listening and Word Meaning tests loaded high on the fourth factor, thus indicating an auditory language factor. However, it did not remain stable, because in March the Listening test shared variance with the Auditory Discrimination and Phonemes tests, while Word Meaning came out as a specific factor.

The factor pattern in September, for experimental White girls (old), was made up of such specific factors as strength of closure and Auditory Discrimination and of such common factors as visual-comprehension and auditory-comprehension. The November factor pattern showed that the loading on Pattern Copying increased, the visual-comprehension factor was still important, the auditory discrimination factor emerged, and a specific factor, Word Meaning came out. The January factor pattern consisted in the strength of closure factor which diminished in loading, the speed of perception factor which was an almost pure specific factor, the auditory discrimination factor which appeared stable, and the auditory language factor which emerged. In the March factor pattern, there were still the strength of closure and speed of perception factors. The auditory discrimination factor was joined by the Listening test, while the Word Meaning test was a specific factor.

As can be seen from the factor patterns for experimental White girls (old), the strength of closure factor emerged and stabilized ahead of the speed of perception factor in the same manner as the auditory discrimination factor did ahead of the auditory language factor. The speed of perception factor was preceded by the visual-comprehension factor and the auditory language factor was preceded by the auditory-comprehension factor.

Factor patterns for experimental White boys (young)

As indicated by the data presented in Table 49, the first factor in the September factor matrix for experimental White boys (young) was the strength of closure as shown by the high loading of the Pattern Copying test. Its greatest importance was evidenced at the second testing period after which it slowly lessened.

The second factor in September was a specific factor on which the Auditory Discrimination test loaded high. In November, this specific factor merged with Phonemes while the speed of perception factor emerged as a specific factor. From November the speed of perception factor continued increasing its loading until it reached its maximum in March.

The third factor started out in September as a specific factor on which the Phonemes test loaded high. In November, it shared variance with the Auditory Discrimination test, thus forming the auditory discrimination factor. From the time of its emergence this factor became

TABLE 49

ROTATED FACTOR MATRICES FOR EXP. WHITE BOYS (YOUNG)
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.953	X	X	X
Identical Forms	X	X	X	.743
Auditory Disc.	X	.920	X	X
Phonemes	X	X	.928	X
Word Meaning	X	X	X	.870
Listening	X	X	X	.750
November				
Pattern Copying	.983	X	X	X
Identical Forms	X	.898	X	X
Auditory Disc.	X	X	.901	X
Phonemes	X	X	.785	X
Word Meaning	X	X	X	.852
Listening	X	X	X	.798
January				
Pattern Copying	.973	X	X	X
Identical Forms	X	.941	X	X
Auditory Disc.	X	X	.579	X
Phonemes	X	X	.953	X
Word Meaning	X	X	X	.884
Listening	X	X	X	.771
March				
Pattern Copying	.935	X	X	X
Identical Forms	X	.970	X	X
Auditory Disc.	X	X	.782	X
Phonemes	X	X	.937	X
Word Meaning	X	X	X	.725
Listening	X	X	X	.914

stable. Its greatest importance was in March.

Variance was shared by the Identical Forms, Word Meaning, and Listening tests to define what was probably a visual-comprehension factor. From November through March, the auditory language factor, on which only the Word Meaning and Listening tests loaded high, emerged and stabilized. Its greatest importance was in January.

A comparison of the factor patterns at each of the testing periods revealed that the factor pattern for experimental White boys (young) in September consisted in three specific factors, strength of closure, auditory discrimination, and Phonemes and what was probably a visual-comprehension factor. In November, the strength of closure factor increased in loading and reached its maximum importance and the speed of perception, auditory discrimination, and auditory language factors emerged. The November factor pattern had the same factors as those at the last two testing periods. However, while the strength of closure factor gradually diminished in importance, the speed of perception increased. While the auditory discrimination factor slightly decreased in January then increased again in March, the auditory language factor increased slightly in January then diminished in March. For the experimental White boys (young) the strength of closure factor emerged early in September, and the speed of perception, auditory discrimination, and auditory language factors emerged at the same time in November. There seemed to be an indication of a visual-comprehension factor preceding the emergence of the auditory language factor and of the specific factor Phonemes or Auditory Discrimination preceding the emergence of the auditory discrimination factor.

Factor patterns for experimental White boys (old)

From the data presented in Table 50 for experimental White boys (old), the strength of closure factor defined by a high loading in Pattern Copying was the first factor in September. In November it shared variance with Word Meaning to indicate what was probably a visual-comprehension factor. The strength of closure factor reappeared as a specific factor in January but in March it shared variance with Listening.

Identical Forms and Listening shared a common variance in September. After two months of reading readiness training, this combination was broken up and Identical Forms defined a specific factor. Once again in January, the Identical Forms-Listening combination appeared. As reading readiness training continued, Identical Forms was left again as a specific factor.

The Auditory Discrimination test was the only test that loaded high on the third factor in September. In November it merged with Phonemes indicating the auditory discrimination factor which was stable through March. This factor reached its greatest importance in January.

The fourth factor, in September, was probably an auditory-comprehension factor for the Word Meaning and Phonemes tests contributed to the variance. In November when this merger split, the Listening test became a specific factor while the Word Meaning test shared variance with Pattern Copying. As reading readiness training continued, the Word Meaning test became a specific factor in January and remained so in March.

The factor pattern in September for experimental White boys (old)

TABLE 50

ROTATED FACTOR MATRICES FOR EXP. WHITE BOYS (OLD) IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.902	X	X	X
Identical Forms	X	.868	X	X
Auditory Disc.	X	X	.960	X
Phonemes	X	X	X	.759
Word Meaning	X	X	X	.770
Listening	X	.785	X	X
November				
Pattern Copying	.901	X	X	X
Identical Forms	X	.963	X	X
Auditory Disc.	X	X	.926	X
Phonemes	X	X	.832	X
Word Meaning	.750	X	X	X
Listening	X	X	X	.933
January				
Pattern Copying	.861	X	X	X
Identical Forms	X	.817	X	X
Auditory Disc.	X	X	.913	X
Phonemes	X	X	.854	X
Word Meaning	X	X	X	.956
Listening	X	.767	X	X
March				
Pattern Copying	.678	X	X	X
Identical Forms	X	.951	X	X
Auditory Disc.	X	X	.780	X
Phonemes	X	X	.939	X
Word Meaning	X	X	X	.967
Listening	.882	X	X	X

was thus made up of two specific factors, strength of closure and *Auditory Discrimination*, and of two common factors. One of the common factors was probably a visual-comprehension factor as shown by the high loadings of the *Identical Forms* and *Listening* tests. The other must have been an auditory-comprehension factor as shown by the high loadings of the *Phonemes* and *Word Meaning* tests. The November factor pattern showed the emergence of the speed of perception and of the auditory discrimination factors, the appearance of the *Listening* test as a specific factor, and the common variance shared by the *Pattern Copying* and *Word Meaning* tests. In January, the strength of closure factor again appeared. The auditory discrimination factor was stable and at the height of its importance. The visual-auditory factor of September came out again, while the *Word Meaning* test was a specific factor. In the March factor pattern, the speed of perception factor reappeared, the auditory discrimination factor was stable, and so was the *Word Meaning* specific factor. The *Pattern Copying* and *Listening* tests shared variance to designate what was probably a visual-comprehension factor.

Factor patterns for control White girls (young)

Table 51 for the control White girls (young) indicates that in September, the first factor was probably a visual-auditory factor as shown by the high loadings of the *Pattern Copying* and *Phonemes* tests. After two months of formal reading instruction for the control young White girls, *Pattern Copying* shared variance with *Identical Forms* to indicate what was probably a visual discrimination factor. In January, *Pattern Copying* was a specific factor (strength of closure) which was stable through March.

TABLE 51

ROTATED FACTOR MATRICES FOR CONT. WHITE GIRLS (YOUNG)
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.902	X	X	X
Identical Forms	X	.939	X	X
Auditory Disc.	X	X	.900	X
Phonemes	.613	X	.684	X
Word Meaning	X	X	X	.634
Listening	X	X	X	.926
November				
Pattern Copying	.872	X	X	X
Identical Forms	.727	X	X	X
Auditory Disc.	X	X	.940	X
Phonemes	X	X	.846	X
Word Meaning	X	.892	X	X
Listening	X	X	X	.974
January				
Pattern Copying	.948	X	X	X
Identical Forms	X	.989	X	X
Auditory Disc.	X	X	.946	X
Phonemes	X	X	.850	X
Word Meaning	X	X	X	.833
Listening	X	X	X	.852
March				
Pattern Copying	.918	X	X	X
Identical Forms	X	.950	X	X
Auditory Disc.	X	X	.832	X
Phonemes	X	X	.814	X
Word Meaning	X	X	.559	.500
Listening	X	X	X	.949

Identical Forms emerged early in September as a specific factor. In November, it merged with Pattern Copying. The Word Meaning test became a specific factor to take the place of Identical Forms as the second factor in the November factor matrix. In January, the speed of perception factor, defined by a high loading in the Identical Forms test, reappeared and became stable through March.

The auditory discrimination factor, defined by high loadings in the Auditory Discrimination and Phonemes tests, established itself early as the third factor in September. Its stability was exhibited through January. In March, its variance was shared by the Word Meaning test.

The auditory language factor also appeared early in September as shown by the high loadings of the Word Meaning and Listening tests. As formal reading by the control White young girls progressed, each of the Word Meaning and Listening tests became specific factors in November. In January, they reappeared as the auditory language factor which was stable through March.

The factor pattern in September consisted in the visual-auditory, speed of perception, auditory discrimination, and auditory language factors. As formal reading progressed, importance was shown by each of the visual discrimination, Word Meaning, and Listening factors. It was only the auditory discrimination factor which was consistent in November. By January, the factor pattern indicated the emergence of the strength of closure factor, the reappearance of the speed of perception and auditory language factors, and the stability of the auditory discrimination factor. In March, all the factors in the January factor pattern appeared but diminished slightly in loadings, except the auditory discrimination factor which was contaminated by the Word Meaning test variance.

Factor patterns for the control White girls (old)

As shown by the data in Table 52 for the control White girls (old), the high loadings of the Pattern Copying test from September to January indicated the stability of the strength of closure factor. In March, there seemed to be a need for comprehension as shown by the variance shared by the Pattern Copying and Word Meaning tests.

The speed of perception factor, defined by high loadings of the Identical Forms test, emerged in September and remained stable at each of the testing periods. It reached its maximum importance in January when it was an almost perfectly pure factor with a loading of .991.

The auditory discrimination factor, characterized by high loadings in the Auditory Discrimination and Phonemes test was also stable, for it appeared at all of the four testing periods although Word Meaning shared its variance in January.

While the auditory language factor emerged early in September and continued to be stable through January, it split in March such that Word Meaning shared variance with Pattern Copying, while Listening was left as a specific factor.

The September factor pattern, for the old control White girls, was composed of the strength of closure, speed of perception, auditory discrimination, and auditory language factors. In November, there was a slight increase in the loadings of the first three factors but a slight decrease in the fourth. In January, all the four factors increased in loadings with the strength of closure, speed of perception and auditory language factors at their maximum. The auditory discrimination factor was bolstered by variance shared with Word Meaning which indicated the

TABLE 52

ROTATED FACTOR MATRICES FOR CONT. WHITE GIRLS (OLD)
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.942	X	X	X
Identical Forms	X	.949	X	X
Auditory Disc.	X	X	.932	X
Phonemes	X	X	.724	X
Word Meaning	X	X	X	.711
Listening	X	X	X	.882
November				
Pattern Copying	.955	X	X	X
Identical Forms	X	.972	X	X
Auditory Disc.	X	X	.849	X
Phonemes	X	X	.845	X
Word Meaning	X	X	X	.522
Listening	X	X	X	.935
January				
Pattern Copying	.984	X	X	X
Identical Forms	X	.991	X	X
Auditory Disc.	X	X	.915	X
Phonemes	X	X	.868	X
Word Meaning	X	X	.522	.706
Listening	X	X	X	.941
March				
Pattern Copying	.900	X	X	X
Identical Forms	X	.960	X	X
Auditory Disc.	X	X	.917	X
Phonemes	X	X	.880	X
Word Meaning	.694	X	X	X
Listening	X	X	X	.942

importance of comprehending what would be heard. The March factor pattern showed a slight decrease in the speed of perception factor and the reappearance of the auditory discrimination factor. It also indicated the importance of visual-comprehension as a common factor and of Listening as a specific factor.

Factor patterns for control White boys (young)

As revealed in Table 53 for control White boys (young), the first factor in September was the strength of closure factor distinguished by the high loading of the Pattern Copying test. Stable through March, this factor had its highest loading in November. As formal reading progressed, the loading decreased slightly in January but increased again in March.

The second factor was probably a visual-comprehension factor for the Identical Forms and Listening tests had high loadings. This combination split up in November and the Identical Forms test was left as a specific factor defined as speed of perception. This factor was stable through March. It reached its period of greatest importance in November then gradually declined.

Auditory discrimination, defined by high loadings of the Auditory Discrimination and Phonemes tests, was the third factor in September. In November, the Auditory Discrimination test was the only highly loaded test on the third factor. As formal reading continued, there seemed to be a great importance of the auditory-comprehension factor as shown by the common variance shared by the Auditory Discrimination, Phonemes, and Word Meaning tests. This was supported by the fact, that in March, the same auditory-comprehension factor appeared with higher loadings even

TABLE 53

ROTATED FACTOR MATRICES FOR CONT. WHITE BOYS (YOUNG)
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.954	X	X	X
Identical Forms	X	.907	X	X
Auditory Disc.	X	X	.917	X
Phonemes	X	X	.842	X
Word Meaning	X	X	X	.936
Listening	X	.520	X	X
November				
Pattern Copying	.961	X	X	X
Identical Forms	X	.981	X	X
Auditory Disc.	X	X	.957	X
Phonemes	X	X	X	.693
Word Meaning	X	X	X	.874
Listening	X	X	X	.781
January				
Pattern Copying	.834	X	X	X
Identical Forms	X	.967	X	X
Auditory Disc.	X	X	.656	X
Phonemes	X	X	.769	X
Word Meaning	X	X	.839	X
Listening	X	X	X	.931
March				
Pattern Copying	.926	X	X	X
Identical Forms	X	.956	X	X
Auditory Disc.	X	X	.878	X
Phonemes	X	X	.757	X
Word Meaning	X	X	.655	.538
Listening	X	X	X	.898

though the Word Meaning tests also shared variance with the fourth factor.

In September the fourth factor was a specific factor, Word Meaning. In November, it shared common variance with Phonemes and Listening to form what was probably an auditory-comprehension factor. When this combination split in January, Listening became a specific factor. In March, its variance was shared with Word Meaning, thus indicating the auditory language factor.

The September factor pattern, for the control White boys (young), consisted in the strength of closure, visual-comprehension, auditory discrimination, and Word Meaning factors. In the November factor pattern, the strength of closure factor reached its maximum importance while the speed of perception factor emerged. There seemed to be a great importance of the Auditory Discrimination test as a specific factor as well as the auditory-comprehension factor at this stage of formal reading. By January, the strength of closure and speed of perception factors were well established though their loadings diminished slightly. High loadings on Listening as a specific factor and on auditory-comprehension as a common factor were important during this period. The March factor pattern indicated the strength of closure factor regaining greater importance, while the speed of perception factor continued to decline to its minimum. The auditory-comprehension factor increased in importance and the auditory factor emerged.

Among the different factors, the strength of closure factor was the first to emerge as well as to stabilize. The speed of perception factor emerged later and it was preceded by a visual-comprehension factor. Although the auditory discrimination factor showed up early in

September, it became unstable at the later testing periods. The antecedent factors of the auditory language factor seemed to be the Word Meaning test as a specific factor and the Listening test as another specific factor.

Factor patterns for control White boys (old)

As indicated by Table 54 for control White boys (old), the first factor in September was strength of closure which was defined by the highly loaded Pattern Copying test. This factor was a stable and highly loaded factor with loadings ranging from .946 to .988. Its greatest importance was in September, then it diminished slowly through January and increased in March.

The speed of perception factor was also a stable and highly loaded factor with loadings ranging from .969 to .991. Its greatest importance was in March when it was an almost perfect specific factor.

The third factor in September was probably an auditory-comprehension factor on which the Auditory Discrimination, Phonemes, and Word Meaning tests loaded high. The variance of the Word Meaning test was almost evenly split, one part contributing to the auditory-comprehension factor and the other contributing to the fourth factor. In November and January, the auditory discrimination factor differentiated with the Auditory Discrimination and Phonemes tests having high loadings. Again in March, the auditory-comprehension factor was important.

The fourth factor was the auditory language factor distinguished by high loadings in the Word Meaning and Listening tests. This was another stable factor throughout the four testing periods. Its greatest contribution to the total variance was in January.

TABLE 54

ROTATED FACTOR MATRICES FOR CONT. WHITE BOYS (OLD) IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.988	X	X	X
Identical Forms	X	.969	X	X
Auditory Disc.	X	X	.895	X
Phonemes	X	X	.799	X
Word Meaning	X	X	.579	.573
Listening	X	X	X	.932
November				
Pattern Copying	.963	X	X	X
Identical Forms	X	.983	X	X
Auditory Disc.	X	X	.870	X
Phonemes	X	X	.847	X
Word Meaning	X	X	X	.730
Listening	X	X	X	.890
January				
Pattern Copying	.946	X	X	X
Identical Forms	X	.979	X	X
Auditory Disc.	X	X	.845	X
Phonemes	X	X	.823	X
Word Meaning	X	X	X	.804
Listening	X	X	X	.920
March				
Pattern Copying	.974	X	X	X
Identical Forms	X	.991	X	X
Auditory Disc.	X	X	.788	X
Phonemes	X	X	.932	X
Word Meaning	X	X	.500	.708
Listening	X	X	X	.923

The factor pattern in September for control White boys (old) was made up of the strength of closure, speed of perception, auditory-comprehension, and auditory-language factors. In November, while the importance of the strength of closure factor diminished, that of the speed of perception and of the auditory language factors increased. At this time, the auditory discrimination factor emerged. As formal reading progressed, the factor pattern in January was similar to that in November, except that the first factor decreased in importance in January, while the fourth, auditory language, increased. In March, while the strength of closure factor increased slightly in importance, the speed of perception factor reached its maximum, and the auditory language factor decreased slightly. The auditory-comprehension factor seemed to be of great importance since it appeared both in September and in March for the control White boys (old).

Factor patterns for experimental Negro girls (young)

The data in Table 55 reveal that for the experimental Negro girls (young), the strength of closure factor was the first factor in September as indicated by the high loading of the Pattern Copying test. In November, its loading was increased to a large extent. In January, Pattern Copying shared variance with the Word Meaning test, thus forming what must have been a visual-comprehension factor. In March, Pattern Copying was again the only test that loaded high on the first factor, thus indicating that it was the strength of closure factor.

The second factor in September was probably a visual-auditory factor because both of the Identical Forms and Auditory Discrimination tests had high loadings. In November, there seemed to be a greater im-

TABLE 55

ROTATED FACTOR MATRICES FOR EXP. NEGRO GIRLS (YOUNG)
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.890	X	X	X
Identical Forms	X	.911	X	X
Auditory Disc.	X	.775	X	X
Phonemes	X	X	.981	X
Word Meaning	X	X	X	.834
Listening	X	X	X	.723
November				
Pattern Copying	.974	X	X	X
Identical Forms	X	.545	X	.603
Auditory Disc.	X	X	.904	X
Phonemes	X	X	.877	X
Word Meaning	X	.861	X	X
Listening	X	X	X	.898
January				
Pattern Copying	.866	X	X	X
Identical Forms	X	.975	X	X
Auditory Disc.	X	X	.807	X
Phonemes	X	X	.937	X
Word Meaning	.524	X	X	X
Listening	X	X	X	.957
March				
Pattern Copying	.926	X	X	X
Identical Forms	X	.993	X	X
Auditory Disc,	X	X	.813	X
Phonemes	X	X	.891	X
Word Meaning	X	X	X	.768
Listening	X	X	X	.863

portance of the visual-comprehension factor as indicated by the high loadings of both the Identical Forms and the Word Meaning tests. In January, the Identical Forms test was the only highly loaded test, thus indicating the speed of perception factor. This factor increased in importance in March with a maximum loading of .993.

During the early part of the year, in September, the Phonemes test came out as a specific factor. As reading readiness training continued, it shared variance with the Auditory Discrimination test, thus giving rise to the auditory discrimination factor. From November through March it was stable, with its highest loading occurring in November.

Auditory language appeared clearly as a factor in September as shown by the high loadings of both the Word Meaning and the Listening tests. However, it became unstable in November as half of the variance of the Identical Forms test shared variance with Word Meaning, while the other half shared with the Listening test. Thus, the importance of the visual-comprehension test was exhibited. In January, the Listening test was a specific factor. In March, it shared variance again with the Word Meaning test to give rise to the auditory language factor.

The September factor pattern for experimental Negro girls (young) was composed of the strength of closure, visual-auditory, Phonemes, and auditory language factors. As reading readiness training continued to November, the strength of closure factor increased in importance, the auditory discrimination factor emerged, and there were indications of the importance of the visual-comprehension factor. In January, the Pattern Copying test shared variance with the Word Meaning test, the speed of perception factor emerged, the auditory discrimination factor continued to be stable but lower in loadings than in November, and the Listening test was a specific factor. At the later period of the reading readiness training, the strength of closure factor reappeared and the speed of perception factor reached its maximum importance. The auditory discrimination factor decreased slightly in importance while the auditory language factor reappeared.

Factor patterns for experimental Negro girls (old)

As shown by the data presented in Table 56, the strength of closure factor identified by a high loading of the Pattern Copying test appeared in September for the experimental old Negro girls. In November it shared variance with the Auditory Discrimination and the Phonemes tests to form what was probably a visual-auditory factor. In January and March the strength of closure factor exhibited stability although its highest loading occurred in September.

The Identical Forms and the Auditory Discrimination tests shared variance in September to indicate what was probably a visual-auditory factor. This combination separated in November so that the Identical Forms test was a specific factor all through the rest of the testing period. Its variance was greatest in March.

At the first testing period, the Phonemes and the Word Meaning tests shared variance to suggest what was probably an auditory-comprehension factor. In November, high factor loadings were noted for Phonemes and Listening. As further reading readiness training continued, the Auditory Discrimination, Phonemes, and Word Meaning tests shared variances together, which showed that the auditory-comprehension factor was still important. It was in March that high factor loadings were

TABLE 56

ROTATED FACTOR MATRICES FOR EXP. NEGRO GIRLS (OLD) IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.961	X	X	X
Identical Forms	X	.934	X	X
Auditory Disc.	X	.699	X	X
Phonemes	X	X	.733	X
Word Meaning	X	X	.920	X
Listening	X	X	X	.956
November				
Pattern Copying	.804	X	X	X
Identical Forms	X	.952	X	X
Auditory Disc.	.844	X	X	X
Phonemes	.531	X	.718	X
Word Meaning	X	X	X	.888
Listening	X	X	.857	X
January				
Pattern Copying	.945	X	X	X
Identical Forms	X	.971	X	X
Auditory Disc.	X	X	.756	X
Phonemes	X	X	.817	X
Word Meaning	X	X	.610	.511
Listening	X	X	X	.940
March				
Pattern Copying	.947	X	X	X
Identical Forms	X	.978	X	X
Auditory Disc.	X	X	.893	X
Phonemes	X	X	.804	X
Word Meaning	X	X	X	.738
Listening	X	X	X	.912

exhibited by the Auditory Discrimination and the Phonemes tests to define the auditory discrimination factor.

Listening was a specific factor in September, as was Word Meaning in November. The two contributed variance to the same factor in January and March giving rise to the auditory language factor.

Factor patterns for experimental Negro boys (young)

Table 57 for experimental Negro boys (young) indicates that the Pattern Copying and the Phonemes tests shared variance in September. In November, the Pattern Copying test shared variance with the Identical Forms test. In January, this merger split at which time each of the two tests became a specific factor. In March, the Pattern Copying test shared variance with another test, Listening.

The second factor in September was a common factor shared by the Identical Forms and by the Listening tests. In November, the Identical Forms test shared variance with Pattern Copying, while each of the Listening and Word Meaning tests became specific factors. As reading readiness training progressed, the Identical Forms test became stable in January and in March to indicate the speed of perception factor.

At the first testing period, the Auditory Discrimination test was a specific factor. At the second testing period, the Auditory Discrimination and the Phonemes tests had high loadings on the same factor, thus defining the auditory discrimination factor. This factor was stable from November through March and its period of greatest importance was in January.

In September, the fourth factor was a Word Meaning factor. In November, the fourth factor was still a specific factor and was defined

TABLE 57

ROTATED FACTOR MATRICES FOR EXP. NEGRO BOYS (YOUNG)
IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.734	X	X	X
Identical Forms	X	.864	X	X
Auditory Disc.	X	X	.966	X
Phonemes	.889	X	X	X
Word Meaning	X	X	X	.932
Listening	X	.705	X	X
November				
Pattern Copying	.924	X	X	X
Identical Forms	.705	X	X	X
Auditory Disc.	X	X	.859	X
Phonemes	X	X	.800	X
Word Meaning	X	.906	X	X
Listening	X	X	X	.931
January				
Pattern Copying	.908	X	X	X
Identical Forms	X	.958	X	X
Auditory Disc.	X	X	.923	X
Phonemes	X	X	.756	X
Word Meaning	X	X	X	.865
Listening	X	X	X	.818
March				
Pattern Copying	.903	X	X	X
Identical Forms	X	.934	X	X
Auditory Disc.	X	X	.888	X
Phonemes	X	X	.753	X
Word Meaning	X	X	X	.816
Listening	.508	X	X	.801

by the Listening test. At the third testing period, the two antecedent specific factors shared common variance to define the auditory language factor.

Among the factors, auditory discrimination emerged and stabilized earliest. The speed of perception and the auditory language factors emerged and stabilized later, while the strength of closure factor was generally unstable.

Factor patterns for experimental Negro boys (old)

As indicated by Table 58, the first factor in the September factor matrix of the experimental old Negro boys was probably a visual-comprehension factor on which the Pattern Copying and the Word Meaning tests loaded high. At the second testing period, the combination split leaving the Pattern Copying test as a specific factor, defined as the strength of closure factor. From November through March, it was a stable factor. Its importance increased in January and leveled off in March.

The Identical Forms and the Auditory Discrimination tests shared variance in September which indicated the importance of a visual-auditory factor. When this factor broke up in November, the Identical Forms test became a specific factor defined as the speed of perception factor. It was stable at each of the remaining testing periods and increased gradually in loading until it reached its maximum in March.

From the start through the end of the fourth testing period, the Auditory Discrimination and the Phonemes tests contributed variance to the auditory discrimination factor. In January, this factor contributed its greatest amount to the total variance of the reading readiness

TABLE 58

ROTATED FACTOR MATRICES FOR EXP. NEGRO BOYS (OLD) IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.943	X	X	X
Identical Forms	X	.968	X	X
Auditory Disc.	X	.529	.718	X
Phonemes	X	X	.889	X
Word Meaning	.597	X	X	.549
Listening	X	X	X	.943
November				
Pattern Copying	.930	X	X	X
Identical Forms	X	.966	X	X
Auditory Disc.	X	X	.747	X
Phonemes	X	X	.860	X
Word Meaning	X	X	X	.877
Listening	X	X	X	.769
January				
Pattern Copying	.972	X	X	X
Identical Forms	X	.969	X	X
Auditory Disc.	X	X	.875	X
Phonemes	X	X	.867	X
Word Meaning	X	X	X	.644
Listening	X	X	X	.890
March				
Pattern Copying	.972	X	X	X
Identical Forms	X	.985	X	X
Auditory Disc.	X	X	.817	X
Phonemes	X	X	.894	X
Word Meaning	X	X	X	.556
Listening	X	X	X	.934

battery.

The auditory language factor, on which the Word Meaning and the Listening tests loaded high, was also stable at all of the testing periods. November was its period of greatest importance.

The September factor pattern, for experimental Negro boys (old), was made up of the visual-comprehension, visual-auditory, auditory discrimination, and auditory language factors. In November, the strength of closure factor emerged from the September first factor, while the speed of perception factor emerged from the September second factor. While the auditory discrimination factor decreased slightly in importance, the auditory language factor increased in November. The factor pattern, in January, was similar to that in November, but all the factors increased in importance, except auditory language, which declined. The March factor pattern included all the factors in the January matrix, but the importance of the strength of closure factor was the same, while the other two diminished. The visual-comprehension and the visual-auditory factors seemed to be the antecedent factors to the strength of closure and speed of perception factors, respectively.

Factor patterns for control Negro girls (young)

As revealed by the data presented in Table 59, the first factor in September was probably a visual-auditory factor since both of the Pattern Copying and Phonemes tests had high loadings. As formal reading progressed, this combination broke down and Pattern Copying was the only highly loaded test on the first factor in November, thus indicating the strength of closure factor. This factor was stable throughout the remaining testing periods. The factor loading gradually increased until

TABLE 59

ROTATED FACTOR MATRICES FOR CONT. NEGRO GIRLS (YOUNG) IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.856	X	X	X
Identical Forms	X	.906	X	X
Auditory Disc.	X	X	.976	X
Phonemes	.879	X	X	X
Word Meaning	X	X	X	.960
Listening	X	.635	X	X
November				
Pattern Copying	.921	X	X	X
Identical Forms	X	.957	X	X
Auditory Disc.	X	X	.955	X
Phonemes	X	X	.668	X
Word Meaning	X	X	X	.798
Listening	X	X	X	.863
January				
Pattern Copying	.949	X	X	X
Identical Forms	X	X	.526	X
Auditory Disc.	X	X	.927	X
Phonemes	X	X	.735	X
Word Meaning	X	.952	X	X
Listening	X	X	X	.938
March				
Pattern Copying	.981	X	X	X
Identical Forms	X	.935	X	X
Auditory Disc.	X	X	.940	X
Phonemes	X	X	.762	X
Word Meaning	X	X	X	.893
Listening	X	X	X	.763

it reached its maximum in March.

The second factor in September was probably a visual-comprehension factor since the *Identical Forms* and the *Listening* tests had high loadings. In November, the *Identical Forms* test was the only test with high loadings on the second factor thus, indicating it as the speed of perception factor. As formal reading continued, the *Identical Forms* test shared variance with the *Auditory Discrimination* and the *Phonemes* tests, thus giving rise to what was probably a visual-auditory factor. In March, the speed of perception factor reappeared.

The third factor in September was a specific factor on which the *Auditory Discrimination* test loaded high. In November, the auditory discrimination factor emerged with both the *Auditory Discrimination* and the *Phonemes* tests which loaded high. But as formal reading progressed up to January, the *Identical Forms* test shared variance with the *Auditory Discrimination* and the *Phonemes* tests. When the *Identical Forms* test became a specific factor in March, the auditory discrimination factor stabilized again.

The *Word Meaning* test was a highly loaded specific factor in September. By the second testing period, it shared variance with *Listening*, thus giving rise to the auditory language factor. When this factor split in January, each of the two tests became a specific factor. Once more in March, they shared common variance.

The visual-auditory and the visual-comprehension common factors and the *Auditory Discrimination* and *Word Meaning* specific factors made up the factor pattern in September for control Negro girls (young). As two months of formal reading instruction took place, the factor pattern in November showed the emergence of the strength of closure, speed of perception, auditory discrimination, and auditory language factors. This pattern was not stable, and in January, only the strength of closure factor held up. A common factor, on which the Identical Forms, Auditory Discrimination, and Phonemes tests loaded high, emerged in January, while there seemed to be greater importance of the separate skills in Word Meaning and in Listening, each of which came out as specific factors. As more formal reading instruction took place up to March, the strength of closure factor increased in importance to its maximum, the speed of perception factor decreased to its minimum, while the auditory discrimination and auditory language factors reappeared.

There seemed to be a tendency among young control Negro girls for the visual-auditory factor to precede the strength of closure factor, for the visual-comprehension factor to precede the speed of perception factor, and for the specific factors, Word Meaning and Listening, to precede the auditory language factor.

Factor patterns for control Negro girls (old)

For control Negro girls (old) as shown by Table 60, the first factor was probably a visual-auditory factor on which the Pattern Copying and Phonemes tests loaded high. When the combination split in November, Pattern Copying was the only highly loaded test, thus indicating the strength of closure factor. Stable from its emergence to the last testing period, the strength of closure factor reached its greatest importance in November.

The second factor in September was the speed of perception factor on which the Identical Forms test loaded high. It increased to its maximum loading in November. In January, it shared a common variance with

TABLE 60

ROTATED FACTOR MATRICES FOR CONT. NEGRO GIRLS (OLD) IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.807	X	X	X
Identical Forms	X	.976	X	X
Auditory Disc.	X	X	.982	X
Phonemes	.876	X	X	X
Word Meaning	X	X	X	.898
Listening	X	X	X	.619
November				
Pattern Copying	.993	X	X	X
Identical Forms	X	.986	X	X
Auditory Disc.	X	X	.955	X
Phonemes	X	X	.705	.533
Word Meaning	X	X	X	.963
Listening	X	X	X	.967
January				
Pattern Copying	.957	X	X	X
Identical Forms	X	.652	X	X
Auditory Disc.	X	X	.819	X
Phonemes	X	X	.871	X
Word Meaning	X	.937	X	X
Listening	X	X	X	.956
March				
Pattern Copying	.971	X	X	X
Identical Forms	X	.945	X	X
Auditory Disc.	X	X	.881	X
Phonemes	X	X	.713	X
Word Meaning	X	X	X	.872
Listening	X	X	X	.840

Word Meaning but stabilized in March.

The third factor in September started out as a specific factor on which the Auditory Discrimination test loaded high. From November through March, the Auditory Discrimination and Phonemes tests shared variance, thus clearly defining the auditory discrimination factor. Its greatest contribution to the total variance of the test battery was in January.

The auditory language factor which emerged in September was defined by the high loadings of the Word Meaning and Listening tests. However, this factor became quite unstable at the two succeeding test periods. In November, it merged with Phonemes. In January, Listening became a specific factor, Word Meaning shared variance with Identical Forms, and Phonemes shared variance with Auditory Discrimination. In March, the auditory language factor reappeared.

The factor pattern in September for control Negro girls (old) consisted in two common factors, visual-auditory and auditory language, and two specific factors, speed of perception and Auditory Discrimination. The November factor pattern showed the emergence of the strength of closure factor as an almost pure factor with a loading of .993 and of the auditory discrimination factor. The speed of perception factor held up with an increased loading, while the Phonemes, Word Meaning, and Listening tests shared a common variance. As shown by the January factor pattern, the strength of closure and the auditory discrimination factors were stable, although the former decreased in importance while the latter increased. There was instability in the other two factors since the Identical Forms test shared variance with Word Meaning and since the Listening test was a specific factor. At the end of the fourth testing period the factor pattern for the control old Negro girls came out with the strength of closure, speed of perception, auditory discrimination, and auditory language factors.

Factor patterns of control Negro boys (young)

Table 61 shows the factor matrices for control Negro boys (young). In the September matrix, the first factor probably was a visual-auditory factor, as indicated by the high loadings of the Pattern Copying and of the Phonemes tests. As formal reading instruction continued, the visual-auditory factor split, in November, leaving the Pattern Copying test as the only highly loaded test, thus indicating the strength of closure factor. This factor increased slightly in importance in January. In March, it became unstable again and this time the Pattern Copying and Auditory Discrimination tests shared variance, which showed the importance of the visual-auditory factor.

The second factor in September was probably a visual-comprehension factor, as shown by the high loadings of the Identical Forms and of the Word Meaning tests. In November, there seemed to be a continued importance of the visual-comprehension factor, since the Identical Forms and the Listening tests were both highly loaded in November. When this factor split in January, Listening became a specific factor, while Identical Forms shared variance once more with Word Meaning. It was in March when the speed of perception factor emerged with the Identical Forms as the only test that had a high loading.

The third factor, in September, started out with the Auditory Discrimination test as a specific factor. November marked the emergence of the auditory discrimination factor in which both of the Auditory Dis-

TABLE 61

ROTATED FACTOR MATRICES FOR CONT. NEGRO BOYS (YOUNG) IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.864	X	X	X
Identical Forms	X	.926	X	X
Auditory Disc.	X	X	.983	X
Phonemes	.835	X	X	X
Word Meaning	X	.579	X	X
Listening	X	X	X	.941
November				
Pattern Copying	.934	X	X	X
Identical Forms	X	.889	X	X
Auditory Disc.	X	X	.872	X
Phonemes	X	X	.809	X
Word Meaning	X	X	X	.912
Listening	X	.533	X	.612
January				
Pattern Copying	.937	X	X	X
Identical Forms	X	.810	X	X
Auditory Disc.	X	X	.929	X
Phonemes	X	X	.743	X
Word Meaning	X	.900	X	X
Listening	X	X	X	.969
March				
Pattern Copying	.850	X	X	X
Identical Forms	X	.925	X	X
Auditory Disc.	.809	X	X	X
Phonemes	X	X	.719	X
Word Meaning	X	X	X	.857
Listening	X	X	.807	X

crimination and the Phonemes tests were highly loaded. This factor maintained its importance in January. However, in March, Auditory Discrimination shared variance with Pattern Copying, while Phonemes shared variance with Listening.

Listening was a specific factor in September. As formal reading progressed, the Word Meaning and the Listening tests shared variance in November. The January matrix showed that the November auditory language factor split such that the Word Meaning test shared variance with Identical Forms, while the Listening test was again a specific factor. Formal reading continued to March and the Word Meaning test became a specific factor.

The September factor pattern started out with two common factors, visual-auditory and visual-comprehension, and two specific factors, Auditory Discrimination and Listening. The November factor pattern showed the emergence of the strength of closure, auditory discrimination, auditory language, and visual-comprehension factors. By January, the strength of closure and the auditory discrimination factors showed stability, while the Word Meaning test shared variance with the Identical Forms test and Listening became a specific factor. Instability seemed to mark the March factor pattern as the speed of perception factor emerged, but the Pattern Copying test shared variance with Auditory Discrimination, and the Word Meaning test stood as a specific factor.

Factor patterns for control Negro boys (old)

Among control Negro boys (old), as indicated by Table 62, the strength of closure factor defined by a high loading in Pattern Copying was stable from the first to the last testing period. Its highest load-

TABLE 62

ROTATED FACTOR MATRICES FOR CONT. NEGRO BOYS (OLD) IN SEPTEMBER, NOVEMBER, JANUARY, AND MARCH

	Rotated Factors			
	1	2	3	4
September				
Pattern Copying	.992	X	X	X
Identical Forms	X	.945	X	X
Auditory Disc.	X	X	X	.902
Phonemes	X	X	.942	X
Word Meaning	X	.629	X	.667
Listening	X	.519	X	X
November				
Pattern Copying	.988	X	X	X
Identical Forms	X	.700	X	X
Auditory Disc.	X	X	.898	X
Phonemes	X	X	.866	X
Word Meaning	X	X	X	.941
Listening	X	.926	X	X
January				
Pattern Copying	.965	X	X	X
Identical Forms	X	.807	X	X
Auditory Disc.	X	X	.846	X
Phonemes	X	X	.885	X
Word Meaning	X	.875	X	X
Listening	X	X	X	.936
March				
Pattern Copying	.947	X	X	X
Identical Forms	X	.812	X	X
Auditory Disc.	X	X	.534	.670
Phonemes	X	X	.937	X
Word Meaning	X	.680	X	X
Listening	X	X	X	.897

ing of .992 was in September. Gradually and slightly, it diminished.

The second factor in September was a common factor, which was probably a visual-comprehension factor whose variance was shared by the Identical Forms, Word Meaning, and Listening tests. In November, Identical Forms shared variance with Listening and in January, as well as in March, it shared variance with Word Meaning.

The third factor in September was a specific factor on which the Phonemes test had a high factor loading. November marked the emergence of the auditory discrimination factor, whose variance was shared by the Auditory Discrimination and Phonemes tests. This factor was stable from the time of its emergence until March. Its greatest importance was felt in November.

The fourth factor was generally unstable. In September, it was a combination of the variance shared by the Auditory Discrimination and Word Meaning tests, which was probably an auditory-comprehension factor. In November, it was a Word Meaning specific factor. In January, it was a Listening specific factor and in March, it was the common variance of the Auditory Discrimination and Listening tests.

The September factor pattern consisted in two specific factors (strength of closure and Phonemes) and two common factors (visual-comprehension and auditory-comprehension). The November factor pattern showed that the strength of closure factor was consistent but declined slightly in loading,and that the auditory discrimination factor emerged. Word Meaning became important as a specific factor, while Identical Forms and Listening contributed to a common variance. In January, the strenth of closure factor continued to diminish in importance and so did the auditory discrimination factor. A new specific factor (Listening) and a new common factor (visual-comprehension) appeared. The March factor pattern upheld the stability of the strength of closure and of the auditory discrimination factors. However, these two factors diminished in importance. The visual-comprehension factor was still important and a new common factor appeared in which the Auditory Discrimination and Listening tests shared variance.

Summary

In summary, the emergence of the factor patterns in reading readiness at each of the four testing periods, and for each of the major White groups (experimental White girls, control White girls, experimental White boys, and control White boys) and eight age subgroups, seemed to indicate the following trends:

1. Factor 1, strength of closure, tended to emerge as a specific factor and to become stable prior to the other factors. This was supported by the fact that it was uniformly defined in September in three of the four major groups and in seven of the eight age subgroups; in November, in all major groups and in six of eight age subgroups; in January, in all major groups and age subgroups; and in March, in all major groups and in six of the eight subgroups.

Its antecedent factors appeared to be a visual-auditory factor to which Pattern Copying and Phonemes contributed variance, or a visual-comprehension factor to which Pattern Copying and Word Meaning or Listening contributed variance.

2. Factor 2, speed of perception, tended to emerge gradually as a specific factor and to become stable during the first two and one-half months of the school year. By November, and also by January, it was a

specific factor for all the major groups and for six of the eight age groups and by March, for all of the major groups and age subgroups.

Its antecedent factors appeared to be a visual-auditory factor to which Identical Forms and Phonemes contributed variance, or a visual-comprehension factor to which Identical Forms and Listening contributed variance.

3. Factor 3, auditory discrimination, tended to emerge gradually and to become a stable factor during the first two and one-half months of the school year. By November, it was a clear factor for half the major groups and for six of the eight age subgroups; in January, for all of the major groups and for five of the eight subgroups; and in March, for half of the major groups and half of the age subgroups.

Its antecedent factors seemed to be the specific factors, Auditory Discrimination or Phonemes, and the common factor, auditory-comprehension, to which the Auditory Discrimination and Listening tests contributed variance.

4. Factor 4, auditory language ability, tended to emerge gradually and to stabilize during the first four and one-half months of the school year. By January, it was a clear factor for all the major groups and for five of the eight age subgroups, and remained so in March.

Its antecedent factors appeared to be the specific factors, Word Meaning or Listening, and an auditory-comprehension factor to which the Phonemes, Word Meaning, and Listening tests contributed variance.

The time at which each factor attained its greatest importance, or had its highest factor loading, or had its highest variance for each of the four major groups and eight age subgroups indicated that:

1. Factor 1, strength of closure, made its maximum contribution

to the total variance in September or November.

2. Each of the remaining three factors made its greatest contribution to the total variance in January or in March.

3. The time at which the several factors had their maximum loadings did not seem to be associated with treatment, sex, or age.

The emergence of the factor patterns in reading readiness at each of the four testing periods, and for each of the four major Negro groups (experimental Negro girls, control Negro girls, experimental Negro boys, and control Negro boys), and for each of the eight age subgroups indicated the following trends:

1. Factor 1, strength of closure, tended to emerge as a specific factor gradually and to become stable during the first two and one-half months of the school year. This was proved by the fact that it was uniformly defined in November in three of the four major groups and in six of the eight age subgroups; in January, in all of the major groups and in seven of the eight subgroups; and in March, in all of the major groups and in six of the age subgroups.

Its antecedent factors appeared to be a visual-auditory factor to which Pattern Copying and Auditory Discrimination and/or Phonemes contributed variance and another common factor, visual-comprehension, to which Pattern Copying and Word Meaning or Listening contributed variance.

2. Factor 2, speed of perception, tended to emerge as a specific factor and to stabilize in March for all of the major groups and for seven of the eight age subgroups.

The antecedent factors appeared to be a visual-auditory factor to which Identical Forms and Auditory Discrimination contributed variance and a visual-comprehension factor whose variance was shared by Identical Forms and Word Meaning or Listening.

3. Factor 3, auditory discrimination, emerged gradually and stabilized as a clear common factor during the first two and one-half months of the school year. By November, it was clear and stable for all the major groups and for seven of the age subgroups; in January, for three of the four major groups and for six of the eight subgroups; and in March, for all of the major groups and for seven of the eight subgroups.

Its antecedent factor seemed to be the specific factors, Auditory Discrimination or Phonemes, and a common factor, auditory-comprehension,to which the Phonemes and Word Meaning and/or Listening tests contributed variance.

4. Factor 4, auditory language, appeared to emerge gradually and to become a stable factor in March for all of the major groups and for six of the eight age subgroups.

The antecedent factors seemed to be the specific factors, Listening or Word Meaning, and an auditory comprehension factor whose variance was shared by the Phonemes or Auditory Discrimination tests, and Word Meaning and/or Listening tests.

5. With respect to the time when these factors had their largest contribution to variance, the strength of closure and auditory discrimination factors seemed to be most important in November or January, while the speed of perception and auditory language factors had their highest contributions to the total variance in March.

6. Treatment, sex, or age did not seem to have any systematic association with the time of maximum contribution to variance.

Comparison between the two races as to the time of emergence and stabilization of each of the four factors showed that among the White groups, the strength of closure factor emerged and stabilized in September, two months earlier than it did among the Negro groups; the speed of perception stabilized in November, four months earlier than it did among the Negro groups; auditory discrimination stabilized in November, at the same time as it did for the Negro groups; and auditory language stabilized in January, two months earlier than it did among the Negro groups.

Comparison between the two races as to the time of maximum loading or variance of each of the four factors indicated that among the White groups, the strength of closure, speed of perception, auditory discrimination, and auditory language factors had their maximum loadings in September or November, January or March, January or March, and January, respectively, practically two months earlier than each did among the Negro groups.

CHAPTER VI

RESULTS AND DISCUSSION: READING ACHIEVEMENT

The middle score of the five subtest grade scores (Word Reading, Paragraph Meaning, Vocabulary, Spelling, and Word Study Skills) of the Stanford Achievement test was determined for each subject to represent his reading median score. The reading median scores were then subjected to an analysis of variance (2 Treatments X 2 Races X 2 Sexes X 2 Ages) with the use of the BMD Computer Program 05V (Dixon, 1964). The resulting means and standard deviations for each subgroup are presented in Table 63. The summary of the analysis of variance is indicated in Table 64. Among the main effects, there were variations significant at the .01 level between races and between sexes. Among the first order interactions, there was variation significant at the .01 level for Race X Treatment. Among the second order interaction effects, there was variation significant at the .05 level for Race X Sex X Age.

To facilitate the interpretation of the data, the null hypotheses as stated originally are hereby reproduced:

(a) Main Effects

(1) There are no significant differences between the means earned under the experimental treatment and under the control treatment.

(2) There are no significant differences between the means earned by girls and by boys.

TABLE 63

NUMBER OF CASES, MEANS, AND STANDARD DEVIATIONS IN THE STANFORD READING ACHIEVEMENT TEST

Subgroups	No. of Cases	Means	SD's
Exp. White Girls (Y)	52	16.462	3.375
Exp. White Girls (O)	47	17.298	5.073
Exp. White Boys (Y)	44	15.432	4.490
Exp. White Boys (O)	59	17.203	4.737
Cont. White Girls (Y)	47	19.021	5.379
Cont. White Girls (O)	47	17.745	4.641
Cont. White Boys (Y)	48	16.333	5.563
Cont. White Boys (O)	54	17.611	4.159
Exp. Negro Girls (Y)	49	15.878	2.619
Exp. Negro Girls (O)	45	15.956	3.937
Exp. Negro Boys (Y)	52	14.808	3.131
Exp. Negro Boys (O)	35	15.514	3.052
Cont. Negro Girls (Y)	46	14.413	3.873
Cont. Negro Girls (O)	44	16.091	3.483
Cont. Negro Boys (Y)	49	13.837	2.544
Cont. Negro Boys (O)	33	13.061	4.015

TABLE 64

ANALYSIS OF VARIANCE TABLE FOR THE STANFORD ACHIEVEMENT TEST

	df	F	P
Treatment (T)	1	.032	
Race (R)	1	52.171	**
T X R	1	13.935	**
Sex (S)	1	13.916	**
T X S	1	2.437	
R X S	1	.233	
T X R X S	1	.027	
Age (A)	1	3.125	
T X A	1	1.050	
R X A	1	.144	
T X R X A	1	1.257	
S X A	1	.469	
T X S X A	1	.363	
R X S X A	1	4.785	*
T X R X S X A	1	3.745	
Error	735		
Total	750		

*Significant at the .05 level.
**Significant at the .01 level.

(3) There are no significant differences between the means earned by the White and by the Negro subjects.

(4) There are no significant differences between the means earned by the young and by the old subjects.

(b) First Order Interaction Effects (hypotheses 5-10): There are no significant interaction effects between the following:

(5) Treatment X Race

(6) Treatment X Sex

(7) Treatment X Age

(8) Race X Sex

(9) Race X Age

(10) Sex X Age

(c) Second Order Interaction Effects (hypotheses 11-14: There are no significant interaction effects among the following:

(11) Treatment X Race X Sex

(12) Treatment X Race X Age

(13) Treatment X Sex X Age

(14) Race X Sex X Age

(d) Third Order Interaction Effects (hypotheses 15):
There are no significant interaction effects among Treatment X Race X Sex X Age.

Hypotheses (1) and (4) were not rejected and any differences were attributed to chance. Hypotheses (2) and (3) were rejected at the .01 level of significance. Hypothesis (5) was rejected at the .01 level of significance while hypotheses (6) to (10) were not rejected. Hypotheses (11) to (13) were not rejected while hypotheses (14) was rejected at the .05 level. Hypothesis 15 was not rejected.

Perusal of the means for the main effects showed that significant differences between sexes were in favor of girls, while significant differences between races were in favor of the White.

The mean scores for the Treatment X Race interaction effects are reported in Table 65.

TABLE 65

MEAN SCORES ON THE INTERACTION EFFECTS BETWEEN TREATMENT X RACE

Race	Treatment	
	Experimental	Control
White	16.649	17.668
Negro	15.519	14.418

In making multiple comparisons of means in the interaction effects of Treatment X Race, the Newman-Keuls sequential range test (Winer, 1962) was used. The complete procedure ie embodied in Appendix G, p.266 , which indicated that all the differences between each of the possible pairs of means were significant at the .05 level. Thus, the control White group had significantly higher means than each of the control Negro, experimental Negro, and experimental White groups. The experimental White group had significantly higher means than each of the control Negro and experimental Negro groups. The experimental Negro group had a significantly higher mean than the control Negro group. The experimental treatment, thus, seemed to be more effective than the control treatment among the Negro subjects and the control treatment seemed to be more effective than the experimental treatment among White subjects.

The mean scores for the Race X Sex X Age interaction effects are reported in Table 66.

TABLE 66

MEAN SCORES ON THE INTERACTION EFFECTS
AMONG RACE X SEX X AGE

Race	Sex	Age	
		Young	Old
White	Girls	17.677	17.521
	Boys	15.902	17.398
Negro	Girls	15.168	16.022
	Boys	14.337	14.324

The Newman-Keuls sequential range test (Winer, 1962) was used for multiple comparisons of the means on the Race X Sex X Age interaction effects. The results (Appendix H, page 267 to 268) showed that out of the 28 pairs of comparisons, 20 were significant at the .05 level while 8 were not significant.

The significant second order interaction, Race X Sex X Age, revealed the three following inequalities:

A. (WGY; WGO; WBO) > (NGO; NBO; NBY; WBY; NGY)

B. (NGO; WBY) > (NBO; NBY)

C. (NGO; WBY) = (NGY) > (NBO)

which should be read: The White girls (young), White girls (old), and White boys (old) did not differ significantly among themselves, but each exceeded the Negro girls (old), Negro boys (old), Negro boys (young), White boys (young), and Negro girls (young).

The Negro girls (old) and the White young boys did not differ significantly from each other, but each exceeded the Negro boys (old) and Negro boys (young).

The Negro girls (old) and the White boys (young) did not differ significantly from the Negro girls (young) which group alone exceeded the Negro boys (old).

CHAPTER VII

RESULTS AND DISCUSSION: DEVELOPMENT OF PREDICTIONS

A stepwise multiple regression analysis of the six reading readiness tests (Pattern Copying, Identical Forms, Auditory Discrimination, Phonemes, Word Meaning, and Listening) and the criterion measure, the Stanford Achievement reading median, was made at each of the testing periods (September, November, January, and March) for each of four groups (experimental White, control White, experimental Negro, and control Negro) with the use of the BMD Computer Program O2R (Dixon, 1964). This program computed a sequence of linear equations such that the variable which made the greatest reduction in the error sums of squares or, in other words, which had the highest partial correlation with the criterion, was added at each step. Among the outputs yielded by this program were the partial regression coefficients (b's) and their respective standard errors (SE's), multiple correlation coefficients (R's) and their respective errors of multiple estimate ($SE's_{est}$), and constants at each step. The coefficients of multiple determination (R^2's) were calculated to determine which variable or combination of variables would maximize the prediction of the criterion. Variables which made an increase in R^2's $\geq .05$ were included in the tables and in the multiple regression equations. Tables 67, 72, 77, and 82 indicate the predictors, partial regression coefficients, standard errors of the partial regression coefficients, coefficients of multiple determination, coefficients of multiple correlation, standard errors of multiple estimate, and constants for each group at each of the testing periods. On the bases of these data, multiple regression equations were generated.

Guilford (1956) explains the use of the following terms: (a) The partial regression coefficients (b's) represent the maximum weights which would assure the optimum correlation between the predicted and the obtained values; (b) The standard error of the b coefficient determines whether each predictor can contribute anything to prediction when its relation to other variables is taken into account; (c) The coefficient of multiple determination tells the proportion of variance of the criterion that is dependent on, or associated with, or predicted by the predictor or predictors combined with the regression weights used; (d) The coefficient of multiple correlation indicates the amount of correlation between one variable and two or more others taken simultaneously. It is also the correlation between an obtained and a predicted value; (e) The standard error of multiple estimate indicates how far the predicted values would deviate from the obtained ones; (f) The constants are used to assure that the means of the predicted values coincide with the means of the obtained scores; (g) Through the regression equation, criterion scores can be predicted for every individual.

Expectancy tables, in terms of the composite weighted scores to predict the end-of-year Stanford Achievement reading median scores, were developed for each of the groups (experimental White, control White, experimental Negro, and control Negro) at each of the testing periods. The composite scores were derived by finding the sum of the products of the beta weights scaled to the hundreds and the raw scores of the corresponding variables. Scattergrams were prepared in terms of the composite scores and of the Stanford Achievement reading median, each of which was in four categories. The frequencies of each cell were converted to percentages of the marginal total per row. These percentages indicated the percentages of subjects who attained a composite score within the range that would be predicted to achieve the Stanford Achievement reading median score in the column under which it fell. The expectancy tables are embodied in Tables 68 to 71, 73 to 76, 78 to 81, and 83 to 86.

Correlation between reading readiness and reading achievement

Appendices I to L, page to page , show the correlation matrices of the six reading readiness tests and the Stanford reading median for each of the four groups (experimental White, control White, experimental Negro, and control Negro) at each of the four testing periods (September, November, January, and March). The ranges of the coefficients of correlation (r's) between the Stanford reading median and each of the following reading readiness tests were: (a) Pattern Copying, .222 to .442; (b) Identical Forms, .061 to .500; (c) Auditory Discrimination, .157 to .545; (d) Phonemes, .327 to .650; (e) Word Meaning, .016 to .511; and (f) Listening; .096 to .500.

End-of-Year predictions from September scores

Table 67 indicates that in September, the single variable which had the highest correlation witn the criterion was Phonemes. The r's were .522, .558, .496, and .327 for the experimental White, control White, experimental Negro, and control Negro groups, respectively. The

TABLE 67

STEPWISE PARTIAL REGRESSION COEFFICIENTS, STANDARD ERRORS, MULTIPLE R^2's, MULTIPLE R's, STANDARD ERRORS OF MULTIPLE ESTIMATE, AND CONSTANTS

(SEPTEMBER)

Predictor	b's	SE's	R^2's	R's	$SE's_{est}$
Exp. White					
4 Phonemes	.098	.022	.272	.522	3.833
3 A. Disc.	.066	.013	.371	.609	3.573
2 I. Forms	.176	.035	.441	.664	3.376
Constant	11.750				
Cont. White					
4 Phonemes	.177	.037	.311	.558	4.157
2 I. Forms	.141	.021	.359	.599	4.020
Constant	11.420				
Exp. Negro					
4 Phonemes	.134	.020	.246	.496	2.806
1 P. Copy.	.273	.059	.328	.573	2.656
Constant	13.339				
Cont. Negro					
4 Phonemes	.124	.026	.107	.327	3.418
2 I. Forms	.066	.018	.174	.417	3.298
Constant	11.920				

second best predictor was Identical Forms which proved effective for three groups (experimental White, control White, and control Negro).

The best multiple predictors for the experimental White subjects were Phonemes, Auditory Discrimination, and Identical Forms, whose combination yielded an R of .664; for control White subjects, Phonemes and Identical Forms whose combination yielded an R of .599; for experimental Negro subjects, Phonemes and Pattern Copying whose combination yielded an R of .573; and for control Negro subjects, Phonemes and Identical Forms whose combination yielded an R of .417.

Multiple regression equations were developed for each of the groups. The general expression of the multiple regression equation (Guilford, 1956) is:

$$X'_c = a + b_1X_1 + b_2X_2 + \ldots\ldots + b_iX_i$$

where: X'_c = predicted score

a = constant

b_1 = beta weight for Variable 1

X_1 = raw score for Variable 1

b_i = beta weight for Variable i

X_i = raw score for Variable i

In this study:

X_1 = raw score in Pattern Copying

X_2 = raw score in Identical Forms

X_3 = raw score in Auditory Discrimination

X_4 = raw score in Phonemes

X_5 = raw score in Word Meaning

X_6 = raw score in Listening

The multiple regression equations generated for the following groups were:

Exp. White: $X'_c = 11.750 + .10X_4 + .07X_3 + .18X_2$

Cont. White: $X'_c = 11.420 + .18X_4 + .14X_2$

Exp. Negro: $X'_c = 13.339 + .13X_4 + .27X_1$

Cont. Negro: $X'_c = 11.920 + .12X_4 + .07X_2$

On the bases of the composite scores scaled to the hundreds, expectancy tables for each of the groups were developed at each testing period. Tables 68 to 71 are the expectancy tables for the experimental White, control White, experimental Negro, and control Negro groups in September.

These tables as a group indicate a moderate discrimination between the extreme ranges of the composite scores and very low discrimination between adjacent ranges. These tables, each being based upon the best combination of predictor variables, afford the teacher little assistance in predicting end-of-year reading achievement on the basis of September performance on tests in this battery.

End-of-year predictions from November scores

The data presented in Table 72 show that in November, Phonemes was again the best single predictor of the criterion for all groups with r's of .533, .592, .611, and .553 for experimental White, control White, experimental Negro, and control Negro groups, respectively.

For the experimental White subjects the best multiple predictors were the Phonemes and Pattern Copying tests whose combination yielded an R of .584; for control White subjects, Phonemes and Auditory Discrimination whose combination gave an R of .638; for experimental Negro groups, Phonemes and Identical Forms which yielded an R of .664; and

TABLE 68

EXPECTANCY TABLE FOR EXPERIMENTAL WHITE SUBJECTS IN SEPTEMBER

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-10	11-21	22-32	33-43
1008 - 1343		37	47	16
672 - 1007		84	16	
336 - 671	1	90	8	
0 - 335	1	99		

Note.-Composite scores = 10 X_4 + 7 X_3 + 18 X_2.

TABLE 69

EXPECTANCY TABLE FOR CONTROL WHITE SUBJECTS IN SEPTEMBER

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-10	11-21	22-32	33-43
948 - 1263		50	45	5
632 - 947		81	19	
316 - 631		96	3	1
0 - 315	6	91	3	

Note.-Composite scores = 18 X_4 + 14 X_2.

TABLE 70

EXPECTANCY TABLE FOR EXPERIMENTAL NEGRO SUBJECTS IN SEPTEMBER

Composite Scores	End-of-the-year Stanford Reading Median			
	0-6	7-13	14-20	21-27
666 - 887			33	67
444 - 665			75	25
222 - 443		12	83	5
0 - 221	1	38	59	2

Note.- Composite scores = 13 X_4 + 27 X_1.

TABLE 71

EXPECTANCY TABLE FOR CONTROL NEGRO SUBJECTS IN SEPTEMBER

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-6	7-13	14-20	21-27
561 - 747			100	
374 - 560		30	52	18
187 - 373		37	59	4
0 - 186	5	60	32	3

Note.- Composite scores = 12 X_4 + 7 X_2.

TABLE 72

STEPWISE PARTIAL REGRESSION COEFFICIENTS, STANDARD ERRORS, MULTIPLE R^2's, MULTIPLE R's, STANDARD ERRORS OF MULTIPLE ESTIMATE, AND CONSTANTS

(NOVEMBER)

Predictor	b's	SE's	R^2's	R's	$SE's_{est}$
Exp. White					
4 Phonemes	.167	.021	.284	.533	3.801
1 P. Copy.	.159	.038	.341	.584	3.656
Constant	9.184				
Cont. White					
4 Phonemes	.151	.024	.350	.592	4.035
3 A. Disc.	.056	.013	.407	.638	3.868
Constant	9.894				
Exp. Negro					
4 Phonemes	.102	.012	.373	.611	2.559
2 I. Forms	.109	.024	.441	.664	2.423
Constant	11.419				
Cont. Negro					
4 Phonemes	.137	.016	.306	.553	3.012
Constant	11.700				

for the control Negro groups, just Phonemes. Addition of another variable resulted in negligible improvement in prediction.

The multiple regression equations developed for the following groups were:

Exp. White: $X'_c = 9.184 + .17X_4 + .16X_1$

Cont. White: $X'_c = 9.894 + .15X_4 + .06X_3$

Exp. Negro: $X'_c = 11.419 + .10X_4 + .11X_2$

Cont. Negro: $X'_c = 11.700 + .14X_4$

Tables 73 to 76 report the expectancies based upon the best conbination of predictor variables in November. Neither the discrimination between the extreme ranges nor between adjacent ranges tended to be of much practical value. Prediction for the Negro children tended to be somewhat better than for White children. The tables afford little assistance to the teacher wishing to predict accurately end-of-year achievement from November scores.

End-of-year predictions from January scores

The data presented in Table 77 reveal that the best single predictor in January for White subjects was Auditory Discrimination whose r's with the criterion were .484 and .545 for experimental White and for control White subjects, respectively. For Negro subjects, Phonemes remained the best single predictor with r's of .346 and .347 for the experimental Negro and for the control Negro groups, respectively.

For the experimental White group, Auditory Discrimination and Pattern Copying made up the best predictor combination which yielded an R of .564; for control White subjects, the best combination for predic-

TABLE 73

EXPECTANCY TABLE FOR EXPERIMENTAL WHITE SUBJECTS IN NOVEMBER

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-10	11-21	22-32	33-43
953 - 1264		67	27	6
641 - 952		93	7	
329 - 640	4	92	4	
17 - 328		100		

Note.- Composite scores = $17\ X_4 + 16\ X_1$.

TABLE 74

EXPECTANCY TABLE FOR CONTROL WHITE SUBJECTS IN NOVEMBER

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-10	11-21	22-32	33-43
1185 - 1579		30	65	5
790 - 1184		80	18	2
395 - 789		100		
0 - 394	7	89	4	

Note.- Composite scores = $15\ X_4 + 6\ X_3$.

TABLE 75

EXPECTANCY TABLE FOR EXPERIMENTAL NEGRO SUBJECTS IN NOVEMBER

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-6	7-13	14-20	21-27
671 - 887			70	30
454 - 670		7	84	9
237 - 453		27	71	2
20 - 236	2	59	39	

Note.- Composite scores = $10\ X_4 + 11\ X_2$.

TABLE 76

EXPECTANCY TABLE FOR CONTROL NEGRO SUBJECTS IN NOVEMBER

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-6	7-13	14-20	21-27
507 - 675		7	66	28
338 - 507	3	21	71	5
169 - 337		44	54	3
0 - 168	3	71	26	

Note.- Composite scores = $14\ X_4$.

TABLE 77

STEPWISE PARTIAL REGRESSION COEFFICIENTS, STANDARD ERRORS, MULTIPLE R^2's, MULTIPLE R's, STANDARD ERRORS OF MULTIPLE ESTIMATE, AND CONSTANTS

(JANUARY)

Predictor	b's	SE's	R^2's	R's	$SE's_{est}$
Exp. White					
3 A. Disc.	.074	.012	.234	.484	3.932
1 F. Copy.	.179	.036	.318	.564	3.720
Constant	9.081				
Cont. White					
3 A. Disc.	.082	.012	.297	.545	4.200
5 W. Mean.	.570	.115	.377	.614	3.964
Constant	7.534				
Exp. Negro					
4 Phonemes	.110	.012	.346	.588	2.613
2 I. Forms	.108	.022	.424	.651	2.459
Constant	9.625				
Cont. Negro					
4 Phonemes	.137	.014	.347	.589	2.922
Constant	10.824				

tion was that of Auditory Discrimination and Word Meaning which gave an R of .614; for experimental Negro subjects, Phonemes and Identical Forms whose combination yielded an R of .651; and for control Negro subjects, Phonemes only.

The multiple regression equations for the following groups were:

Exp. White: $X'_c = 9.081 + .07X_3 + .18X_1$

Cont. White: $X'_c = 7.534 + .08X_3 + .06X_5$

Exp. Negro: $X'_c = 9.625 + .11X_4 + .11X_2$

Cont. Negro: $X'_c = 10.824 + .11X_4$

Tables 78 to 81 report expectancies based upon the best composite scores in January. The discrimination between extreme ranges was of some value, especially in Negro schools. The tables afford little assistance to the teacher in making accurate end-of-year predictions.

End-of-year predictions from March scores

Table 82 indicates that in March the best single predictor of criterion scores for experimental White subjects was the Auditory Discrimination test which had an r of .444. The Phonemes test was the best single predictor for the control White, experimental Negro, and control Negro groups (r's = .528, .629, .650, respectively).

The best multiple predictors for experimental White subjects were the Auditory Discrimination and Pattern Copying tests whose combination yielded an R of .530; for control White subjects, Phonemes and Listening whose combination yielded an R of .607; for experimental Negro subjects, Phonemes and Word Meaning whose combination gave an F of

TABLE 78

EXPECTANCY TABLE FOR EXPERIMENTAL WHITE SUBJECTS IN JANUARY

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-10	11-21	22-32	33-43
936 - 1221		77	17	6
650 - 935	1	84	15	
364 - 649	2	98		
78 - 363		100		

Note.- Composite scores = $7 X_3 + 18 X_1$.

TABLE 79

EXPECTANCY TABLE FOR CONTROL WHITE SUBJECTS IN JANUARY

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-10	11-21	22-32	33-43
1209 - 1527		57	37	6
890 - 1208		89	11	
571 - 889		98	2	
252 - 570	10	90		

Note.- Composite scores = $8 X_3 + 6 X_5$.

TABLE 80

EXPECTANCY TABLE FOR EXPERIMENTAL NEGRO SUBJECTS IN JANUARY

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-6	7-13	14-20	21-27
786 - 1008			78	22
563 - 785		13	81	6
342 - 562		42	58	
121 - 341	4	73	23	

Note.- Composite scores = 11 X_4 + 11 X_2.

TABLE 81

EXPECTANCY TABLE FOR CONTROL NEGRO SUBJECTS IN JANUARY

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-6	7-13	14-20	21-27
507 - 675		17	67	16
338 - 506		32	62	5
169 - 337	3	56	41	
0 - 168	5	79	17	

Note.- Composite scores = 14 X_4.

TABLE 82

STEPWISE PARTIAL REGRESSION COEFFICIENTS, STANDARD ERRORS, MULTIPLE R^2's, MULTIPLE R's, STANDARD ERRORS OF MULTIPLE ESTIMATE, AND CONSTANTS

(MARCH)

Predictor	b's	SE's	R^2's	R's	$SE's_{est}$
Exp. White					
3 A. Disc.	.082	.017	.197	.444	4.027
1 P. Copy.	.183	.038	.281	.530	3.821
Constant	7.444				
Cont. White					
4 Phonemes	.187	.031	.279	.528	4.252
6 Listening	.780	.150	.368	.607	3.991
Constant	.625				
Exp. Negro					
4 Phonemes	.107	.013	.396	.629	2.512
5 W. Mean.	.369	.081	.460	.678	2.383
Constant	8.160				
Cont. Negro					
4 Phonemes	.158	.014	.422	.650	2.747
Constant	9.551				

.678; and for control Negro subjects, Phonemes alone.

For the following groups the multiple regression equations in March were:

Exp. White: $X'_c = 7.444 + .08X_3 + .18X_1$

Cont. White: $X'_c = .625 + .19X_4 + .78X_6$

Exp. Negro: $X'_c = 8.160 + .11X_4 + .37X_5$

Cont. Negro: $X'_c = 9.551 + .16X_4$

Tables 83 to 86 report expectancies based upon the best combinations of tests administered in March. The discrimination between adjacent ranges tends to be negligible and of little practical value. Predictions for White pupils based upon the extreme ranges may be made with considerable caution. For Negro pupils the predictions typically will be more accurate than for White subjects. In fact, it appears that the most precise discrimination for Negro pupils may be made between pupils whose scores fall in the lower two and in the upper two of the four ranges reported.

The analyses presented in this chapter indicate that the prediction of end-of-year achievement for each of the four major groups generally may be based upon two of the six tests and that the test having the most general utility is Phonemes. All expectancy tables demonstrate poor discrimination and there appears to be only slight improvement throughout the year. The tables for Negro pupils indicate that predictions may be of greater value for this group than are the tables for White pupils. In general the expectancy tables demonstrate the hazards of making individual or group predictions.

TABLE 83

EXPECTANCY TABLE FOR EXPERIMENTAL WHITE SUBJECTS IN MARCH

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-10	11-21	22-32	33-43
1002 - 1305		77	20	3
698 - 1001	1	91	6	1
394 - 697	3	97		
90 - 393		100		

Note.- Composite scores = $8 X_3 + 18 X_1$.

TABLE 84

EXPECTANCY TABLE FOR CONTROL WHITE SUBJECTS IN MARCH

Composite Scores	End-of-the-year Stanford Reading Median			
	0-10	11-21	22-32	33-43
1761 - 2165		73	25	3
1356 - 1760		95	5	
951 - 1355	5	95		
546 - 950	25	75		

Note.- Composite scores = $19 X_4 + 78 X_6$.

TABLE 85

EXPECTANCY TABLE FOR EXPERIMENTAL NEGRO SUBJECTS IN MARCH

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-6	7-13	14-20	21-27
895 - 1121		4	77	20
668 - 894		15	83	1
441 - 667		58	42	
214 - 440	4	74	22	

Note.- Composite scores = $11\ X_4 + 37\ X_5$.

TABLE 86

EXPECTANCY TABLE FOR CONTROL NEGRO SUBJECTS IN MARCH

Composite Scores	End-of-the-Year Stanford Reading Median			
	0-6	7-13	14-20	21-27
579 - 771		16	70	14
386 - 578		41	59	
193 - 385	3	77	19	
0 - 192	7	86	7	

Note.- Composite scores = $16\ X_4$.

CHAPTER VIII

ANALYSES OF RESULTS BY ABILITY LEVELS

In addition to the analyses reported previously, the investigators analyzed the criterion data by levels of ability as defined by the Pintner-Cunningham Primary Test, Form A. Revised. The criterion data were the median grade equivalent scores of five subtests of the Stanford Achievement Test, Primary I, 1964 Edition. The total sample (N=953) was divided as closely as possible into four groups approximating quarters of the total distribution. These four ability groups were designated as follows:

Level 4 - Pintner-Cunningham scores 38-54; N=246
Level 3 - Pintner-Cunningham scores 30-37; N=219
Level 2 - Pintner-Cunningham scores 21-29; N=242
Level 1 - Pintner-Cunningham scores 0-20; N=246

In subsequent discussion, the ability groups will be referred to in terms of these levels.

The investigators attempted to use a 2 x 2 x 2 x 4 Analysis of Variance design to analyze race, sex, treatment, and levels of ability, but the data did not conform sufficiently well with the assumptions of homogeneity of variance and of proportionality of N's among the several cells to permit meaningful interpretations. The data reported in Tables 87 and 88 will clarify the reasons why the inclusions of race confused the analysis.

TABLE 87

SIGNIFICANCE OF DIFFERENCES BETWEEN THE MEAN ABILITY OF SELECTED PAIRS OF GROUPS OF SUBJECTS

	N	Mean	S. D.	$\overset{D}{\overline{X}}$	SE	t	Signif
Experimental total	512	28.03	11.80	1.41	.73	1.93	-
Control total	441	29.44	10.52				
White experimental	267	35.33	9.08	1.16	.87	1.33	-
White control	216	34.17	9.88				
Negro experimental	245	20.08	8.94	-4.82	.83	5.81	.01
Negro control	225	24.90	9.02				
White experimental	267	35.33	9.08	15.25	.79	19.30	.01
Negro experimental	245	20.08	8.94				
White control	216	34.17	9.88	9.27	.90	10.30	.01
Negro control	225	24.90	9.02				
White total	483	34.81	9.45	12.42	.61	20.36	.01
Negro total	470	22.39	9.29				

TABLE 88

NUMBER AND MEAN ACHIEVEMENT SCORES OF SUBJECTS CLASSIFIED BY LEVEL, RACE AND TREATMENT

Ability	Group	N	Mean	S.D.	$D_{\bar{X}}$	S.E.	t	signif.
Level 4	White exp.	122	18.63	4.51	-.59	.98	.60	-
	Negro exp.	9	19.22	2.68				
	White cont.	93	20.04	5.72	+1.54	.99	1.56	-
	Negro cont.	22	18.50	3.70				
Level 3	White exp.	79	16.66	3.70	-.19	.59	.32	-
	Negro exp.	34	16.85	2.45				
	White cont.	58	17.33	3.37	+1.25	.60	2.08	.05
	Negro cont.	48	16.08	2.86				
Level 2	White exp.	46	15.02	2.95	-1.25	.57	2.19	.05
	Negro exp.	74	16.27	3.07				
	White cont.	40	15.00	3.30	-.23	.64	.36	-
	Negro cont.	82	15.23	3.37				
Level 1	White exp.	20	12.55	3.25	-1.09	.78	1.40	-
	Negro exp.	128	13.64	3.02				
	White cont.	25	12.36	3.08	-.30	.73	.41	-
	Negro cont.	73	12.66	3.35				

The data indicate that the differences between the mean raw scores earned on the Pintner-Cunningham by the total experimental and the total control groups were not significant; now were the differences between the mean scores earned by White experimental and White control subjects. The mean ability scores of the groups designated in each of the remaining four paired comparisons did differ significantly. The differences between White and Negro groups were large and consistent in direction.

The distribution by level of White and of Negro subjects in both the experimental and the control groups is reported in Table 88. These data indicate that for the experimental subjects at the first level, the ratio of Negro subjects to White was approximately six to one and for the control subjects the ratio was three to one. At Level 2, the ratio of Negro subjects to White subjects in the experimental and in the control group was 1.6 to 1.0 and 2.0 to 1.0, respectively. The ratios were reversed at Level 3, and at Level 4 the ratios of White to the Negro subjects were 13.6 to 1 and 4.2 to 1 for the respective treatment groups.

The data in Table 88 also indicate that within levels established on the basis of the Pintner-Cunningham test, differences associated with race were either not significant or contradictory. Of the eight comparisons only two were significant and one of these two favored each race. The difficulties presented by the data led the investigators to make parallel analyses for the two races.

In separate analyses by race, a 2 x 2 x 4 Analysis of Variance design was used to analyze sex, treatment, and levels of ability effects. Table 88 reports the results of these analyses for Negro subjects.

For the Negro sample, the F ratio for treatment main effect was significant at the .05 level of confidence and the F ratio for ability

TABLE 89

ANOV (SEX, TREATMENT AND ABILITY LEVELS) FOR NEGRO SUBJECTS

	df	F	Sig.
Sex	1/454	3.07	-
Treatment	1/454	5.02	.05
Levels	3/454	41.90	.01
S x T	1/454	0.07	-
S x L	3/454	0.11	-
T x L	3/454	0.04	-
S x T x L	3/454	1.39	-

levels main effect was significant at the .01 confidence level (Table 89). The data for which significant F ratios were found was further analyzed by use of the t-test. For the Negro sample, the hypothesis that there is no significant difference between the mean criterion scores of subjects receiving treatment E and subjects receiving treatment C *over all levels of ability was* not rejected at the .05 level of confidence. The following are the data upon which this finding was based.

	N	Mean	S.D.	$D_{\bar{X}}$	SE	t	Sig.
NE	245	15.09	3.35	.19	.33	.58	-
NC	225	14.90	3.74				

The hypothesis that there was no significant difference between the mean criterion scores of Negro subjects receiving treatment E and subjects receiving treatment C *at any levels of ability* was rejected at the .05 level of confidence. Table 90 presents data showing that for the Negro sample for ability levels 1 and 2, at the .05 level of confidence, the experimental treatment was more effective than the control treatment. For ability levels 3 and 4 there was no significant difference at the .05 level between treatment E and treatment C for the Negro sample.

For the White sample, as reported in Table 91, the F ratio for sex main effect was significant at the .05 confidence level, and the F ratio for levels of ability main effect was significant at the .01 confidence level. For the White sample, at the .05 level, there was no significant treatment main effect and no significant interaction effects.

The further analyses by t-tests reported in Table 92 showed no significant difference over all ability levels by sex for the White experimental groups. For the White control groups, a significant difference

TABLE 90

SIGNIFICANCE OF DIFFERENCES BETWEEN TREATMENTS BY LEVELS OF ABILITY OF NEGRO SUBJECTS

Ability	Group	N	Mean	S.D.	$D_{\bar{X}}$	SE	t	Sig.
Level 4	Exp. Cont.	9 22	19.22 18.50	2.68 3.70	.72	1.19	.61	-
Level 3	Exp. Cont.	34 48	16.85 16.08	2.45 2.86	.77	.59	1.31	-
Level 2	Exp. Cont.	74 82	16.27 15.23	3.07 3.37	1.04	.52	2.04	.05
Level 1	Exp. Cont.	128 73	13.64 12.66	3.02 3.35	.98	.47	2.09	.05

TABLE 91

ANOV (SEX, TREATMENT AND ABILITY LEVELS) FOR WHITE SUBJECTS

	df	F	Sig.
Sex	1/467	6.28	.05
Treatment	1/467	1.77	-
Levels	3/467	44.45	.01
S x T	1/467	0.75	-
S x L	3/467	1.84	-
T x L	3/467	.73	-
S x T x L	3/467	0.49	-

TABLE 92

SIGNIFICANCE OF THE DIFFERENCES BETWEEN SEXES FOR EACH TREATMENT FOR WHITE SUBJECTS

	N	Mean	S.D.	$D_{\overline{X}}$	SE	t	Sig.
WME	137	16.80	4.53	.35	.53	.66	-
WFE	129	17.15	4.18				
WMC	117	16.62	4.76	1.89	.71	2.66	.01
WFC	100	18.51	5.51				

TABLE 93

SIGNIFICANCE OF DIFFERENCES BETWEEN SEXES AT EACH ABILITY LEVEL FOR WHITE SUBJECTS

Ability		N	Mean	S.D.	$D_{\overline{X}}$	SE	t	Sig.
Level 4:	ME	63	18.40	4.45	.48	.82	.59	-
	FE	59	18.88	4.61				
Level 3:	ME	45	17.09	4.04	1.00	.81	1.23	-
	FE	34	16.09	3.18				
Level 2:	ME	18	13.72	1.81	2.14	.75	2.85	.01
	FE	28	15.86	3.25				
Level 1:	ME	12	12.00	4.02	1.38	1.26	1.09	-
	FE	8	13.38	1.98				

was found at the .01 confidence level. This difference showed that the female control group did significantly better than the male control group.

Analyses for each level of ability for the White experimental sample were made by sex. The hypothesis that there was no significant difference between males and females was not rejected for levels of ability 1, 3, and 4. For level 2, at the .05 confidence level, the White experimental female group did significantly better than the experimental male group. These data are reported in Table 93.

The analyses of the reading achievement reported in this Chapter indicate that proportionately the number of beginning Negro pupils having low mental ages is much greater than the number of White pupils having comparable levels of development. This suggests that the problem of teaching such children to read is far more general than in the White schools. The analyses reported above indicates that the extended readiness training program was more effective for the mentally immature children than was the basal reading program, but not more effective for the more mature children. The investigators received numerous incidental reports from teachers and supervisors during the progress of the study to the effect that the extended readiness program was more satisfactory in rooms having large numbers of immature pupils than in rooms having few such pupils. The analysis of achievement results and teacher reports lead to the conclusion that the experimental program designed for this study was particularly appropriate for pupils who enter school at immature levels.

CHAPTER IX

MATERIALS AND PROCEDURES EMPLOYED

One of the basic assumptions of this entire study was that, within the limits imposed by the experimental readiness training, both control and experimental teachers would use similar methods, materials, and procedures in reading instruction. In both types of class, the teachers were instructed to follow their basal reading program, as they usually did in previous years. The only variation from this common approach to beginning reading was to be a delay in such instruction for those pupils given intensive readiness training for two, four or six months.

Although all teachers in the experiment were expected to employ the same basal approach, it is quite possible that they might introduce variations in the methods or procedures which might effect the measured outcomes of the experiment. For example, various basal reader series vary somewhat in their emphases upon the use of experience charts, phonic skills, development of language abilities and extent of oral reading, as well as in other details. Since all teachers were not required to use the same basal reader series, and they were free to make their own personal emphases within the general framework of the series, minor variations in the basal reader method were possible.

Another source of variation in procedures and use of materials is present in the fact that the schools in the experiment were segregated in terms of race. It is possible that either the negro or white teachers in both the experimental and control groups might introduce practices or use the basal reading materials in some fashion other than that common to the other group.

For these various reasons, a more detailed study of the actual classroom practices in experimental and control, negro and white classrooms was essential. For this purpose, a questionnaire previously used in an investigation of classroom basal reading practices was employed.*

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* Bureau of Applied Social Research, "Reading Instruction in the United States." Preliminary report, Columbia University, 1961.

The 76 items of this questionnaire which dealt with materials and procedures were used plus eleven additional items devised by the authors of this study. In addition, 19 questions dealing with the intensive readiness training offered in the experimental classes were addressed to those teachers. (See Appendix _M_).

The questions were divided into eight main categories: A. Reading Materials, 11 items; B. Workbooks and Exercises, 7 items; C. Audio-Visual Activities, 17 items; D. Training for Word Recognition, 17 items; E. Word Meaning and Comprehension, 10 items; F. Study and Critical Skills, 13 items; G. Oral Reading Activities, 6 items; H. Classroom Organization, 7 items; I. The Special Readiness Program, 12 items. Responses to each item in the first seven categories were recorded in terms of frequency of use or practice.

Experimental vs. Control Group

The experimental group of 32 first grade teachers is designated

E_t. The 16 white teachers within this group is designated E_1; the negro teachers, as E_2. The control group, designated C_t, is similarly divided into the subgroups, C_1 for white teachers, C_2, negro teachers. The E_t and C_t groups were analyzed by the Kolmogorov-Smirnov 2-tail test for two independent samples with alpha set at the .05 level, except for two items for which the data permitted only the X^2 analysis.

The null hypothesis that $E_t = C_t$ was not rejected at the .05 level in the case of 83 items. In other words, there were no significant differences in the classroom basal reading practices of the total experimental and total control groups of teachers in 83 items of the questionnaire. The E_t and C_t groups differed at the .01 level of significance in the Reading Materials category in two items. In these two items E_t exceeded C_t.

A_8 - The use of special books for advanced readers

A_9 - Children participate in a book club

In the Audio-Visual category, E_t exceeded C_t at the .05 level of significance in two items:

C_3 - Films or filmstrips for other subjects or general enrichment

C_{11}- Reading stories to children (by teacher)

In no instance, did the C_t group show significantly greater use of materials and procedures than the E_t group.

These results are significant in indicating that there were no major differences in the detailed classroom practices and use of materials between the experimental and control groups of teachers. The "experimenter bias" which is a common concomitant of participation in an experiment, and leads to extraordinary, although often unconscious, efforts to produce the goals of the experiment were apparently largely absent in this study. The minor differences observed may be weighed in terms of the expectancy that at the .05 level at least four or five significant differences would occur by chance alone. It would be expected that two or three of these differences would favor E_t and a similar number would favor C_t. On this basis, there is no indication that were significant differences in the classroom practices of the E_t and C_t groups.

Intra-Group Comparisons

By Kolmogorov-Smirnov 2-tail test at the .05 level, the null hypothesis of no difference was not rejected on 73 items, in the comparison of the E_1 (white) and E_2 (negro) experimental teachers. Of the 14 items showing significant differences in classroom practices, E_1 group made significantly greater use than did E_2 on the following items:

A_7 - Library books from school or public library

A_9 - Children participate in a book club

C_9 - Puppets

D_{12}- Contractions

D_{14}- Abbreviations

E_6 - Learning about words with similar or opposite meanings

E_7 - Learning meanings of suffixes as clues to word meanings (ing, ed, ly)

F_7 - Children help make and read charts

For six items, E_2 exceeded E_1, as follows:

C_2 - Films or filmstrips specifically for reading or reading instruction

C_7 - Flannel-Boards

F_9 - Anticipating outcomes of stories

F_{10}- Recounting sequence of events after reading

G_2 - Oral reading by children from books of their own choice

G_5 - Oral reading in a dramatization

For the analysis of the C_1 and C_2 groups, the null hypothesis of no significant differences was not rejected at the .05 level on 77 items. Of the 10 items showing significant differences in classroom practices, C_1 made greater use than C_2 in the following items:

A_2 - Supplementary readers from one or more reading series

A_7 - Library books from school or public library

D_{12}- Contractions

E_3 - Children use dictionaries to find word meanings

G_1 - Oral reading from basic readers

The C_2 group made significantly more use than did the C_1 in these five items:

E_6 - Field trips to broaden experiences of children

C_8 - Pictures (for story-telling)

E_9 - Children arrange picture sequence and tell story

F_5 - Learning alphabet as an aid to reading

H_3 - Number of reading groups that teacher works with each day

In these two intra-group comparisons, only two items referring to the use of "library books from the school or public library" and "teaching children to recognize and read contractions" are repeated. No precise reason for these differences is apparent, but it is possible to conjecture regarding probable explanations for these two differences, and for those which appear to be related, in clarifying the variations in classroom practices of negro and white teachers in this study.

White teachers appear to make greater use of basic instructional materials such as the basal reader, supplementary basals, dictionaries, school and public libraries. They also appear to place a greater emphasis upon structural analysis in word recognition, i.e. contractions, abbreviations, suffixes.

In contrast, negro teachers place an emphasis upon building experiences and vocabulary through such media as films, filmstrips, field trips, picture materials and the like. They also find it desirable to introduce a wider variety and more individualized instructional procedures by using more reading groups, more oral reading of books selected by the children and greater use of oral reading in dramatization activities.

All four of these tendencies could be interpreted as practical steps in first grade reading instruction toward recognizing and meeting the language development differences and variations in experimental background which are present in a comparison of southern negro and white pupils. Because of their economic advantages, the white pupil population is probably more ready to profit from use of the basic instructional materials, and the white teachers properly emphasize these tools earlier and to a greater degree than would be appropriate in the negro schools. Because of this same difference in the populations, the negro teachers properly substitute many first-hand and vicarious experiences intended to promote language and vocabulary development before introducing the more formal materials and skills.

Speaking as a reading specialist, we may make several observations regarding these differences in classroom practices in this sample of negro and white schools. The rate of introduction to more formal materials or the need for more intensive experiences in language and vocabulary should be a major concern of teachers, particularly during the beginning reading stages. Practically all reading authorities emphasize the essential nature of this discrimination and the consequent adaptation of classroom instructional practices. It appears that our groups of teachers made the appropriate adaptations within the framework of the basal reading program to the needs of their pupils.

These same adaptations are common practice in the basal program in an effort to produce the greatest reading development of which pupils are capable. Undoubtedly, many pupils were given experiences to promote language development and vocabulary in the white schools, while many negro pupils were introduced early to the more formal instructional materials, as the individual differences dictated. Because of these opposing tendencies in both negro and white classes, there is no reason to believe that the group tendencies observed here would produce significant differences in the reading performances of the negro and white pupils as measured by the final achievement tests of the study.

Inter-Group Comparisons

Other possible comparisons in terms of the segregated schools would be between the experimental and control white teachers, and a second between the experimental and control negro teachers. The E_1 and C_1 analysis showed significance at the .05 level for three items. E_1 exceeded C_1 in

A_9 - Children participate in book club

F_5 - Learning the alphabet as an aid to reading

In one item, C_1 exceeded E_1,

C_{14} - Using tape recorder

These differences may be considered as chance findings and there is no reason to suspect that there were any major differences in the practices of the white experimental or control teachers.

The comparison between E_2 and C_2 groups, both negro teachers, showed significant differences in nine items. E_2 exceeded C_2 in

A_8 - Special books for advanced readers

C_{12}- Listening to records (auditory training)

D_{11}- Plurals and endings

D_{15}- Word recognition games

F_9 - Anticipating outcomes of stories

G_1 - Oral reading from basic readers

G_5 - Oral reading in a dramatization

C_2 - exceeded E_2 in two items:

B_3 - Special Phonics

D_9 - Learning to divide words into syllables

The number of these differences between the practices of the negro control and experimental teachers demands some analysis. The control negro teachers were not involved in delaying formal instruction by reason of the experimental intensive readiness procedures. Hence, as a group they apparently tended to proceed more rapidly toward the use of more formal materials and skills.

In contrast, the experimental negro teachers were impelled by the nature of the experiment to give more attention to individual differences. They tended to respond to this concept by extending their efforts as in A_8, D_{15}, C_{12}, as noted above. Again, however, there is no reason to believe that these slight variations in classroom practices produced significant changes in the pupils' reading performances.

Comparison with National Sample

A further analysis of the classroom practices of the teachers involved in this study is possible by comparing the present data with that obtained in the original study in which the questionnaire was employed. The national sample consisted of 1033 teachers in grades 1-6, including 186 first-grade teachers. This sample of teachers was selected to be representative of teachers in general in average public schools. Thus it is possible to compare our relatively small sample of teachers with a representative sample of first-grade teachers in a total of 41 items of the questionnaire.

For the E_1 comparison with the national sample, by the Kolmogorov-Smirnov 2-tail test for two independent samples, the null hypothesis of no significant difference was not rejected for 37 items. Our E_1 group made greater use than the national sample of

A_7 - Library books from school or public library
A_9 - Children participate in book club
B_1 - Reading readiness workbooks and exercises
E_7 - Learning meanings of suffixes as clues to word meanings

In no instance did the national sample show greater use of a specific practice than the E_1 group.

For the C_1 comparison, the null hypothesis was not rejected for 40 of the 41 items. The only difference was in item E_7 - Learning meanings of suffixes as clues to word meanings, in which the C_1 group exceeded the national sample.

For the E_2 comparison, the null hypothesis was not rejected for 39 of the 41 items. The E_2 group made greater use than the national sample of

C_2 - Films and filmstrips specifically for reading or readiness instruction

E_8 - Learning to read in phrases or thought units to help get meaning (in oral reading)

For the C_2 group the null hypothesis was not rejected for 40 items. The C_2 group made greater use of B_2 - Graded workbooks which accompany basic readers, than did the national sample.

The number of differences between the classroom practices of our first-grade teachers and a national sample is too small to imply that our teachers varied significantly in their instructional practices and use of materials. If any observation may be made, it is the recurrence of the tendency for items A_7, use of the library, to be used to a greater extent among the white Florida teachers than by the negro teachers (E_1 exceeded E_2 and C_1 exceeded C_2) or the national sample in the case of E_1. In contrast, item C_2, the use of films and filmstrips, is significantly greater in our total experimental population, in the E_2 versus the E_1 group, and in the E_2 versus the national sample. For unknown reasons, our experimental teachers emphasize this facet of the basal reading program.

Special Readiness Program

Twelve items were added to the original questionnaire to sample teacher practices and opinions regarding the training procedures and materials included in the intensive readiness program. Since it was apparent that the experimental negro and white teachers reacted somewhat differently to the conditions of the experiment, the analysis of responses will be made in these separate categories. In view of the earlier observation of the tendencies for white teachers to emphasize more formal materials and training, and for negro teachers to stress certain pre-reading experiences, we might expect these group trends to influence their instructional practices in the readiness program.

The first questions dealt with the total time devoted each day to the intensive readiness program and the division of time between the blackboard and seatwork exercises. The mean total time reported by negro teachers was 84.3 minutes; for white teachers, 61.3 minutes. The negro teachers spent a mean of 26.3 minutes per day at the blackboard exercises, and 56.9 minutes per day with the worksheets. In contrast, the white teachers reportedly used a mean of 16.8 minutes in blackboard exercises and 26.7 minutes in the worksheets. They did not allocate the remaining 18 minutes to either the blackboard exercises or the work with worksheets. Of the three comparisons, only that in amount of time spent with the worksheets is significantly different indicating that negro teachers spent a significantly greater time with this type of training than did white teachers.

The next group of questions dealt with the number of groups formed for readiness instruction. Since pupils were to be scheduled for training in visual perception or auditory perception or both on the basis of the repeated tests, variation in the number of groups was possible. The negro teachers used a single group for training purposes in twelve classes, and two separate training groups in four classes. Of the fifteen white teachers reporting, ten used separate groups, five, a single training group. Eight of the negro teachers claimed to give the same amount of time to each of the readiness groups (although only four teachers actually reported forming such separate groups) while four claimed to spend more time in auditory than visual perception training, which in this case may be an accurate statement. All fifteen white teachers reported using the same amount of time daily for the separate training groups (although only ten claimed to have formed such separate groups in the previous question). This question was obviously misinterpreted by both white and negro teachers and must be disregarded. A possible explanation of the confused reporting here may lie in the fact that special readiness groups were, in a sense, reformed after each testing, depending upon the apparent pupil needs. Hence, the numbers and types of such groups, as well as the members, varied at different times in the year. Teachers may have been reporting their organizational patterns in answer to these questions for different times and conditions, thus offering apparently contradictory answers.

The next group of questions asked the teacher respondents to list the names and sexes of those pupils in which teacher judgments differed from the readiness test indications. Specifically, they were asked to list the children who, in their opinion, were ready to read but were denied entrance into reading instruction because of poor performance on the readiness tests. They were to list these pupils separately for each of the four administrations of the tests. The second question asked teachers to list those pupils who were admitted to reading instruction after each testing, but who, in teacher judgment, were not ready for such instruction. Thus these questions attempted to sample the validity of the indications of the readiness tests by comparison with the criterion of teacher judgment.

The white teachers tended to have lower standards of readiness than the test criterion (successive quarters of the white subjects each testing period). They listed 14%, 12%, 11%, and 0% of the poor test performers in the four successive test administrations as ready in their opinion. At the same intervals, they listed 4%, 8%, 8% and 0% as not ready, despite good test performance. It should be noted that these figures refer to proportions of different populations, for the test criterion in the four testings indicated the following proportions: a) 25% ready, 75% not in total groups of approximately 480 negro and 450 white pupils; b) Additional 23% of each total racial group selected from those not admitted to reading instruction at first testing; c) Approximately a third 25% ready at third testing; d) The final 25% admitted to reading. In other words, the first testing released 25% of the white and of the negro population into reading groups; the second released about one-fourth of each population; the third testing, another fourth; the final testing, the remaining fourth.

The negro teachers tended to have higher standard of readiness than the tests, for after each testing they disagreed that pupils were ready for reading in 10%, 15%, 18% and 3% respectively of the groups. In the four test administrations, they disagreed with the results, declaring the children ready for reading instruction, despite poor test performances, in 12%, 8%, 3% and 0%.

To summarize the responses to these two questions, white teachers tended to disagree with the test results by insisting that the scores underestimated the readiness status of their pupils. Their disagreements on the basis of overestimation of readiness were much less frequent after each testing. In contrast, negro teachers disagreed by claiming that the scores overestimated the readiness status of a sizeable number of children, and in each testing pointed out a much smaller number of underestimations. After each testing, the number of overestimations by the tests in comparison with teacher judgment were greater among the negro teachers, and the number of underestimations greater among the white teachers.

The next three questions dealt with the teachers' opinions of the blackboard exercises, the frequency of their use, and the amount of time devoted to this type of work in the separate readiness groups. All eleven of the negro teachers who offered a relevant statement were strongly in favor of the blackboard exercises and pointed out such values as training in muscular coordination, left-right orientation and improvement in visual discriminations. Four teachers misunderstood the question and gave irrelevant answers.

Twelve white teachers gave positive approval to the blackboard exercises, while three were negatively disposed. Seven of the negro teachers used these exercises in the readiness group every day, as had been suggested by the directors of the study. Nine teachers used them two or three times a week. Among the white teachers, practices were quite similar with six using the blackboard every day, eight using it two or three times a week. One teacher was convinced that these exercises were useless and soon dropped them.

The mean number of minutes spent with a special readiness group in the blackboard exercises was 15.3 minutes among the negro teachers and 14.1 minutes among the white teachers. The respective ranges were from 10-20 minutes and 5-20 minutes reflecting the instructions which had suggested ten minutes per session for this training. It is apparent that the tendency for the white teachers to emphasize a more formal program for their pupils did not seriously interfere with their willingness to try these blackboard exercises.

The final four questions sampled the teachers' opinions and use of the commercially prepared worksheets in visual discrimination, visual motor skills, beginning sounds and rhyming. These worksheets were supplied in multiple copies of loose pages to permit teachers to pace their use and re-use in terms of pupil needs. This flexible arrangement differed from usual classroom practices and caused some problems in logistics, filing and the like which might have been expected to create some negative teacher reactions. However, perhaps because of the resemblance of this activity to common workbooks, the reactions of the teachers were, on the whole, strongly positive. All negro and white teachers strongly endorsed the visual discrimination materials, and all but two reacted similarly to the beginning sounds and rhyming training. The only negative comments were concerning the difficulty of the second half of these materials. In the case of the visual motor skills, six negro and seven white teachers felt these rapidly became too difficult for their pupils.

Certain observations may be made of the data derived from these twelve questions regarding teacher practices in the special readiness program. We find that negro teachers spent a significantly greater amount of time per day in the use of the worksheets than did the white teachers. We do not know whether this difference occurred because of 1) the working speed of the pupils of 2) the tendency to identify only a single readiness group in these classes (and, perhaps, to conduct several types of seatwork readiness activities each session). Although white teachers formed more separate groups for various types of readiness training, they conducted these sessions in somewhat less total time and spent significantly less time on the seatwork activities.

The blackboard exercises which departed from commonly used readiness activities were reacted to positively by most teachers, used about as frequently as suggested, and for approximately the amount of daily time suggested. Most of the commercial worksheets were strongly commended by all teachers with reservations regarding the difficulty of the exercises which appeared in the latter half of the materials. This criticism of the complexity of the exercises was particularly marked in the case of the training offered for visual motor skills.

CHAPTER X

SUMMARY AND CONCLUSIONS

The basic purpose of this study was to determine the effect of an intensified and extended readiness program upon first-grade reading achievement. The conduct of the experiment has been adequately described in earlier sections of this report and need not be repeated here. Rather it is relevant to point out that there are a number of corollary implications and conclusions that maybe drawn from the study, in addition to the evaluation of the experimental readiness program. For example, the interactions of the experimental treatment, sex of the pupils, their mental ability levels and their races may be observed. The possible effects of the teachers' philosophy and practices in following a basal reading program of instruction and their relationships to the effectiveness of the special readiness training may be noted for pupils of different sexes, ability levels or races. The nature and extent of longitudinal growth in various factors significant in readiness may be measured for pupils with or without the special readiness program and for various sexes, races and levels. The predictive values of various combinations of readiness tests at various times in the school year in foretelling end-of-year reading achievement may be observed. Finally, the data assembled for the study permit factor analysis of the factor patterns of readiness in the various subgroups of pupils. We will cite the conclusions bearing on these aspects of the study and attempt to interpret their implications for first-grade reading instruction.

Growth Curves

As described earlier, growth curves based on the repeated testing by readiness tests were computed for each subgroup of children according to race, age, sex, and experimental and control groups. These results were reported in terms of the specific readiness tests used in the study.

Pattern Copying - Growth in the visual discrimination skills associated with the Pattern Copying test was significant during the period from September to March for the White experimental boys and girls. In contrast, the control White children who received no special readiness training needed four months to equal the growth of the experimentals in the first two months.

Among the experimental negro children, significant growth in this aspect of visual discrimination was present among girls from September through March and for boys from September to January. The control Negro pupils also grew significantly during the period from September to March. But, again, it required four months of school for these pupils to equal the gains shown by the Negro experimental groups in a two-month period. It took these children until March to match the growth shown by the experimental Negro children in November.

Since, as shown later, this aspect of visual discrimination is significant for reading achievement it is apparent that the experimental training program is superior to a basal reading program in producing early, rapid and significant skill development of this type among both White and Negro pupils of young (74 months or less) and old (75 months or more) categories. There is apparently some growth in this area either as a result of the basal reading instruction or maturation of the pupils. But this growth is slow for both sexes in both races, requiring four to six months to reach the level achieved with the training in two months. Thus the readiness training was effective and economical in producing rapid growth in this aspect of visual discrimination.

Identical Forms - the results of the special readiness training in this second significant aspect of visual discrimination are quite similar to that found for Pattern Copying. In this skill, White experimental boys and girls showed significant growth particularly in the first two months of the related readiness training. Negro experimental pupils showed significant growth in this area during the first four months of special training.

In contrast, the control White girls improved in this skill but did not show significant gain during any two-month interval; and control White boys evidenced significant growth only during the first two months of their program. This facet of visual discrimination is, as shown later, significant for first-grade reading achievement. The results found here indicate that early and significant growth of this skill is stimulated by the readiness program especially in the first two to four months. This growth in two months was sufficient to equate the White experimental pupils with the controls, who had tested significantly higher in Identical Forms in the beginning. It appears that two months of the related readiness training was very effective for the White experimental groups who were poorer in this area, and that Negro pupils, except young Negro girls, benefit greatly from four months of such training. There is some growth of this ability in a basal reading program or as a result of maturation, but this growth is less than that produced by planned training except among young Negro girls. No significant sex differences in controls or experimentals were observed in this area of development, among White pupils. Among Negro experimental pupils, the older girls appeared to profit from the training to an even greater degree than boys after both two and four months.

Auditory Discrimination - As a result of the readiness training, White experimental boys and girls showed significant growth in this important factor during the entire six month training period, while the corresponding Negro pupils gained markedly during the first four months.

Under the basal reading program, control White pupils showed significant gains in this area during the first four months. Negro control boys showed significant growth for two months, Negro control girls for four months. Among all White pupils there was no significant advantage in the special readiness training for this skill, nor were there any sex differences. Among all Negro girls, again there was no advantage in the special program. Among Negro boys, however, the experimentals exceeded the controls at the end of a four month interval.

It would appear that there is no particular advantage to the special readiness training in Auditory Discrimination when compared to that offered in a basal reading program, except perhaps for older Negro boys. This group alone responded with greater development as a result of special training, and with significantly lesser growth in a basal program without such training.

Phonemes - As previously noted, the knowledge of beginning and ending sounds in words was measured by two editions of the Murphy-Durrell Diagnostic Reading Readiness Tests. The results based on the 1949 test were reported above under Auditory Discrimination. Those obtained from the 1964 version are reported here. These tests were closely parallel in structure and function and we would expect them to give similar results.

Experimental White boys and girls improved significantly in this factor for a four month period, while control White pupils grew similarly for a two month interval. Negro experimental pupils grew significantly for a four month interval, while Negro control girls made similar gains. Negro control boys showed significant growth only during the first two-month period.

The implications from this test are consistent with those given in discussing Auditory Discrimination above namely, that the special training seemed more profitable than that offered in a basal reading program only for older Negro boys.

Word Meaning - The results here are based upon that subtest of the Metropolitan Readiness Test which asked pupils to match a picture with one of three meanings spoken by the examiner. In effect, the test is a measure of auditory vocabulary. The experimental White girls and boys showed significant growth in this factor over a four month period, while the corresponding control White pupils developed significantly only for a two-month period.

Experimental White boys and girls achieved growth in this factor in four months equivalent to that present among White control boys and girls only after six months. Experimental White boys responded to the special training in this area with even greater growth than the experimental White girls, particularly during the first four months of the program. No significant sex differences appeared among the control girls and boys in the basal reading program.

Negro experimental girls evidenced significant growth for four months and Negro boys for six months in this factor. In contrast, the control Negro girls developed slowly in this factor, without significant gain until after four months. The Negro control boys also took four months to show any significant gain but this growth continued at this high rate for the next two months.

Although the basal reader program produced some growth in the factor of auditory vocabulary, it is apparent that the experimental program stimulated more rapid, greater and earlier development among both White and Negro pupils, for both young and old pupils.

Listening - This readiness factor was sampled by the repeated administration of that subtest of the Metropolitan Readiness Test which required the children to show comprehension of a sentence presented auditorily by marking a related picture. The test might be considered a measure of auditory comprehension at a very simple level. Growth in this factor was continuous for experimental White boys and girls for the six month period, with significant gains during the first two months.

Control White girls showed precisely the same pattern of gradual growth with significant gain in the first two months. Control White boys, however, showed significant gains at the first two and four month testings. The amount of growth was greater for the experimental pupils at the first two and the four month testings.

The experimental Negro pupils made significant gains at the two and four month intervals. The control Negro girls and boys showed significant gains only at the two month testing. However, there were no significant differences between the growth of the experimental or control

Negro boys and girls. In the control Negro groups, girls excelled the boys significantly at the end of four months, and were somewhat superior in this area throughout the entire program.

Apparently both basal and experimental training programs stimulate continuous growth in auditory comprehension. The experimental program was somewhat superior in producing growth only among White pupils both young and old. There tend to be some differences between the sexes in the variability of performances and in the amount of growth, with the difference favoring girls, particularly among Negro pupils. If these tendencies can be generalized to other populations, they should serve as a guide to differentiated instruction for the sexes in this area, for many studies indicate the importance of development of auditory comprehension for success in early reading.

Factor Patterns

From the factor analysis of the six readiness tests a number of factors were identified, although not precisely as had been anticipated by some of the research staff. Visual discrimination emerged as two factors - 1) strength of closure for which the antecedents were Pattern Copying and Phonemes or Pattern Copying and Word Meaning and Listening and 2) speed of perception - Identical Forms and Phonemes or Identical Forms and Listening. As noted in the earlier discussion of other studies, these factors have been recognized previously in comparable tests.

A third factor, auditory discrimination, was defined largely by the Auditory Discrimination and Phonemes tests or by the Auditory Discrimination and Listening tests. A fourth factor, auditory language ability, was defined largely by the Word Meaning and Listening tests or an auditory - comprehension factor, composed of the Phonemes, Word Meaning and Listening tests. It appears that factor 1, strength of closure made its greatest contribution to the total variance in September or November, while the other factors made theirs in January or March. All four factors tend to emerge and stabilize to make their greatest contribution to the total variance two months earlier among the White groups than among the Negro groups.

There appear to be four significant elements or factors accounting for the performances of the pupils in the battery of readiness tests. As hoped by the research staff, these factors coincided with the elements of readiness emphasized in the experimental program. Thus the factor analysis, in one sense, confirms the judgment of the researchers in identifying and stressing certain components of reading readiness. This parallelism does not, of course, prove that the training materials used to encourage development of these elements of readiness were necessarily the best choice or the most effective materials. But it does indicate that the factors to be stressed in a reading readiness program, insofar as these are identifiable by the battery of tests we employed, are those stressed here. Perhaps a larger battery of readiness tests might identify still other significant factors, and show that these are also worthy of instructional emphasis in a readiness program. But our data (and experience) makes this a simple conjecture.

Analysis of Reading Achievement

The median score on the subtests of the Stanford Achievement Primary Battery was used as an indication of the pupils' academic performance or their reading median score. While this is the most representative score of the child's academic achievement, it is quite possible that the relationships with the variables might have been different in the separate measures of reading, vocabulary, word study skills and spelling. However, such a detailed analysis was not feasible within the limitations of this study.

The reading median scores were analyzed for their relationships with the experimental treatment and the variables of age, sex and race. The interactions of these variables may be summarized as follows:

1. There were no significant differences between the mean scores achieved
    - a. under the experimental or the control treatment
    - b. by young and old subjects
2. There were significant differences between the means earned
    - a. by girls and by boys
    - b. by the Negro and White subjects
3. There were no significant interaction effects between
    - a. treatment and sex
    - b. treatment and age
    - c. race and sex
    - d. race and age
    - e. sex and age
    - f. treatment, race and sex
    - g. treatment, race and age
    - h. treatment, sex and age
    - i. treatment, race, sex and age
4. There were significant interaction effects between
    - a. treatment and race
    - b. race, sex and age

These results may be paraphrased or interpreted in the following manner: In reading achievement, the greatest growth was shown a) by girls; b) by the White pupils; c) the control pupils among the White groups; d) by the experimental pupils among the Negro groups. The three variables of race, sex and age were interrelated in this manner: White girls and older White boys were similar in achievement but exceeded all Negro pupils and young White boys; Older Negro girls and young White boys were similar but exceeded all Negro boys; older Negro girls and younger White boys were similar to younger Negro girls which group alone exceeded older Negro boys.

A rough hierarchy of reading achievement would progress upward from 1) older Negro boys to 2) young Negro girls, older Negro girls and younger White boys to 3) older White boys and White girls at the highest level.

Perhaps the major implication of this study is the fact that the experimental readiness program was of significant value for Negro pupils. Other observations regarding the interaction with achievement of age, sex and race have been found in may other beginning reading studies. Again we find that age at beginning school has little relationship to reading achievement, that girls of both races exceed boys and that White pupils tend to exceed Negro pupils in segregated schools.

A second implication that may be pointed out is the similarity in achievement of experimental and control groups, despite the delay in introduction to reading instruction among the experimentals. It is obvious that this delay did not interfere with or retard eventual reading achievement as measured at the end of the first grade. This is a significant observation, for many school systems and teachers hesitate to offer extended readiness training, even when there is reason to believe it desirable. Our experimental groups who received anywhere from two to six months less reading instruction were not retarded in their development of reading skills to any appreciable degree. In a sense, the readiness training was a satisfactory substitute for basal reading instruction and promoted normal development of reading ability in the final test. Moreover, our data indicate that the experimental readiness program was a superior approach among Negro pupils, for those pupils given the special readiness training exceeded the controls trained in the basal reading program. This difference was present despite the fact that the Negro experimental groups were inferior in mental ability to the Negro controls.

Analysis by Ability Levels

The criterion data, the median grade equivalent scores of the subtests of the Stanford Achievement Test, Primary I, were also analyzed by levels of mental ability, as measured by the Pintner-Cunningham Primary Mental Test. The total sample was divided into four groups or roughly four quarters as follows:

Level 4 - Pintner-Cunningham scores 38-54 = M.A. 6-1 to 8-4
Level 3 - Pintner-Cunningham scores 30-37 = M.A. 5-5 to 6-0
Level 2 - Pintner-Cunningham scores 21-29 = M.A. 4-10 to 5-4
Level 1 - Pintner-Cunningham scores 0-20 = M.A. Below 4-10

Based on this analysis, a number of observations were possible:

1. Experimental and control groups were not significantly different in mean raw scores on the Pintner-Cunningham test.

2. White experimental and White control groups were also not significantly different.

3. Negro experimentals were significantly inferior to Negro controls in this facet. This comparison is particularly significant in

view of the fact that these Negro experimentals exceeded their controls in ultimate reading achievement, presumably because of the special readiness training.

4. White experimental and control groups and the total White population were significantly superior to the corresponding Negro groups in this area.

5. In the White control group, girls significantly exceeded boys in the criterion achievement. This sex difference was not present in the White experimental groups, implying that the special readiness training enabled boys to equal the criterion achievement of girls. This sex difference in the control groups may also be interpreted as signifying that, under the usual basal reading program, certain factors tend to promote superior reading achievement among girls, but that these factors might be counterbalanced by a special readiness program for boys, at certain levels of ability, as noted later. Some observers have noted this difference and attributed it to the nature of the reading materials, assuming that these have greater appeal and stimulation for girl pupils. Our data merely confirms the sex difference in basal programs, without indicating the underlying reasons.

6. In the White and Negro groups, level of mental ability was significantly related to reading achievement. This observation has been confirmed in may other studies and gives rise to the implication that mental ability should probably be given careful consideration in admitting children to the beginning reading program, or even to school. Certain factors in basal reading programs, perhaps such as large classes and lack of individualization of instruction, make it difficult for children of

lesser ability to achieve in reading. Our data do not clarify the reasons for this relationship, but simply emphasize the need for its consideration in current school situations.

7. In the White groups, the experimental treatment was not significantly related to reading achievement.

The lack of significance, in general, of the experimental program among White pupils has been remarked upon previously.

8. In the White experimental groups, there was no significant difference by sex in level of ability groups 1, 3 and 4. At level 2 (M.A. 4-10 to 5-4) the White experimental female group did significantly better than the experimental male group. It would appear that at certain levels of ability the sex difference is more significant than the special readiness program. This appears to be true at the lower levels of mental ability for the differences were significant at Level 2 and insignificantly in favor of the girls at Level 1. At the upper levels of ability, the experimental program in White classes apparently enables boys to equal the achievement of girls, or it counterbalances the factors in the program which tend to predispose greater achievement for girls.

9. For the Negro sample, the experimental treatment was significant for criterion achievement for levels of ability 1 and 2 only (M.A. below 5-5). This analysis modifies somewhat the earlier general observation of the values of the special readiness program for all Negro pupils; implying that its greatest values were for pupils of lower mental ability. However, the same trend was present to a non-significant degree in the comparison of Negro experimentals and controls at all levels.

10. When compared in criterion achievement, at various levels of ability, there were several significant differences between the Negro and White groups. The Negro experimentals exceeded the White experimentals in reading achievement by a significant amount at Level 2 and by non-significant amounts at all other levels. These data imply that the experimental program was more successful among Negro pupils in producing reading achievement than it was among White pupils.

This result may well reflect the attitudes and practices among the Negro teachers. As we will point out later, these teachers spent a significantly greater amount of time per day in directing children in the special readiness training materials. This greater emphasis upon the readiness training appears to have enabled the Negro experimental children to equal or surpass the achievement of the White experimental pupils, when the groups are equated for mental ability.

11. When equated for mental ability, the White control pupils at level 3 (M.A. 5-5 to 6-0) exceeded the Negro control pupils in reading achievement. They also exceeded the Negro control pupils by a non-significant amount at level 4, but this trend was reversed, although the differences were insignificant, at levels 1 and 2. This result may be interpreted to imply that at the upper levels of mental ability, White pupils tend to achieve greater reading achievement in a basal reading program, even when equated in mental ability with Negro pupils. There is no obvious explanation of this finding in our data, for such a trend could conceivably reflect teacher goals and flexibility, the suitability of the basal reading materials in terms of cultural differences, the degree of variability of pupil response to such a program, or other factors.

Analysis of Teacher Practices

As previously described, a questionnaire of 87 to 106 items was administered to all teachers to sample their daily practices and uses of materials. The purpose of this questionnaire was fivefold: a) to ascertain whether control and experimental teachers followed similar basal reading practices, with the exception of the special readiness program; b) to compare parctices between Negro and White experimentals, and controls; c) to compare Negro experimentals and controls, and White experimentals and controls; d) to compare the teachers in our study with a national sample and e) to sample the teachers' practices in the special readiness program.

The results of the questionnaire were as follows:

1. There were no major differences in the practices of experimental and control teachers in their applications of the basal reading program.

2. In a comparison by race, White teachers appear to emphasize basic instructional materials such as readers, supplementary basals and libraries to a greater degree. Negro teachers stressed more the building of experiences and vocabulary through films, filmstrips, trips, pictures and the like. They employed more reading groups and more oral reading of child-selected books and in dramatization than did the White teachers. In terms of the expected needs of their respective populations, these trends were quite appropriate.

3. There were no major differences in the practices of White experimental and control teachers. Negro experimental teachers, however, appeared to give more attention to individual differences, as in auditory

training, special books for advanced readers and word recognition games, than the Negro control teachers. There is no evidence of the significance of this difference in teacher practice between Negro experimental and control groups, for the differences in achievement between these two groups were a reflection of both the experimental program and the practices of the experimental teachers. It is significant to note, however, that Negro teachers apparently responded somewhat more fully to the implicit goal of the study, namely to discover and provide improved instruction for pupils.

4. There were no major differences between the teacher population of this study in practices in a basal reading program (excepting, of course, the special readiness training) and a national sample of first-grade teachers.

5. In the special readiness program, Negro experimental teachers spent a significantly greater amount of class time with the seatwork training. White experimental teachers tended to disagree with the repeated readiness tests by insisting that the scores underestimated the readiness status of their pupils. Such teachers were anxious to induct children into the basal reading program as early as possible. Negro experimental teachers disagreed with the repeated test scores in claiming that they overestimated the readiness status of their pupils. In contrast to the White teachers, the Negro teachers appeared to wish to delay formal reading instruction, often in spite of the adequate readiness scores of their pupils. These attitudes were consistent with the minor differences in their classroom practices, as noted above.

There is no objective means of evaluating the subtle effect of these slightly different philosophies of first-grade reading programs upon the reading achievement of the respective pupils. But these observations are most pertinent to the basic validity of the entire study, for a marked variation in classroom practices by any of the groups of teachers involved would have raised grave problems in interpreting the results.

Prediction of Reading Achievement

Although this analysis was not a primary goal of the study, the data on repeated tests made possible the study of the predictive validities of various combinations of the readiness tests at different points in the school year. A multiple regression analysis of the six readiness tests and the reading median score used as the criterion of achievement was performed at each of the testing periods of September, November, January and March for each of the four groups of pupils. Expectancy tables to predict the end-of-year achievement scores were also developed for these groups.

The details of these predictive combinations of tests are given earlier in this report. The table below simply summarizes the findings. The best combination of predictors is entered opposite each group with the best single predictive test underlined.

The implications of Table 94 and the expectancy tables given earlier are that prediction of end-of-year achievement is feasible in most groups by two tests and that of all the tests the one having the greatest general usefulness is Phonemes. Discrimination in the expectancy tables is poor, however, and hardly suitable for individual prediction, although the predictions may be of somewhat greater value for Negro groups than for Whites.

TABLE 94

READING ACHIEVEMENT PREDICTORS

	September	November	January	March
Exp. White	Phonemes Auditory Dis. Ident. Forms	Phonemes Pattern Copy.	Auditory Dis. Pattern Copy.	Auditory Dis. Pattern Copy.
Control W.	Phonemes Ident. Forms	Phonemes Auditory Dis.	Auditory Dis. Word Meaning	Phonemes Listening
Exp. Negro	Phonemes Pattern Copy.	Phonemes Ident. Forms	Phonemes Ident. Forms	Phonemes Word Mean.
Control N.	Phonemes Ident. Forms	Phonemes	Phonemes	Phonemes

It may be noted that in these groups the widely used Metropolitan Readiness test contributed little to prediction, while of the two relatively unknown and uncommercialized tests Identical Forms was more efficient than the difficult Pattern Copying test.

APPENDICES

APPENDIX A

UNACCOUNTED FOR VARIANCE AND % CONTRIBUTION OF ROTATED FACTORS IN THE TOTAL READING READINESS BATTERY VARIANCE FOR WHITE GROUPS

	Rotated Factors				Unaccounted for Variance
	1	2	3	4	
Exp. White Girls					
September	15.2	14.0	11.3	26.8	32.7
November	15.4	14.1	31.1	15.0	24.4
January	15.3	15.5	24.1	21.5	23.6
March	14.4	15.2	23.3	20.3	26.8
Cont. White Girls					
September	14.4	15.2	22.5	22.4	25.5
November	16.1	15.1	30.1	15.3	23.4
January	15.7	16.4	26.6	24.2	17.1
March	14.7	15.0	25.5	21.4	23.4
Exp. White Boys					
September	18.6	22.1	19.0	12.1	28.2
November	15.9	14.4	21.3	20.0	28.4
January	15.5	14.3	26.0	21.3	22.9
March	14.1	16.0	24.8	21.1	24.0
Cont. White Boys					
September	15.9	15.3	24.4	20.5	23.9
November	15.6	16.3	21.8	23.2	23.1
January	14.3	15.8	22.6	22.4	24.9
March	14.8	15.9	28.3	20.9	20.1

APPENDIX B

UNACCOUNTED FOR VARIANCE AND % CONTRIBUTION OF ROTATED FACTORS TO THE TOTAL READING READINESS BATTERY VARIANCE FOR YOUNG WHITE GROUPS

	Rotated Factors				Unaccounted for Variance
	1	2	3	4	
Exp. White Girls (Y)					
September	16.3	22.6	19.4	19.8	21.9
November	15.5	12.7	32.1	14.7	25.0
January	14.1	18.3	30.4	14.1	23.1
March	14.8	14.9	23.3	22.1	24.9
Cont.White Girls (Y)					
September	19.8	14.7	21.3	21.0	23.2
November	21.5	13.3	26.7	15.8	22.7
January	15.0	16.3	26.9	23.7	18.1
March	14.0	15.0	27.8	19.2	24.0
Exp. White Boys (Y)					
September	15.1	14.1	14.3	31.2	25.3
November	16.1	13.4	23.8	22.7	24.0
January	15.8	14.7	20.7	22.9	25.9
March	14.5	15.7	24.8	22.7	22.3
Cont. White Boys (Y)					
September	15.2	18.2	25.8	14.6	26.2
November	15.4	16.0	15.3	30.9	22.8
January	11.6	15.6	28.7	14.4	29.7
March	14.3	15.2	29.2	18.2	23.1

APPENDIX C

UNACCOUNTED FOR VARIANCE AND % CONTRIBUTION OF ROTATED FACTORS TO THE TOTAL READING READINESS BATTERY VARIANCE FOR OLD WHITE GROUPS

	Rotated Factors				Unaccounted for Variance
	1	2	3	4	
Exp. White Girls (O)					
September	14.2	21.4	12.6	23.5	28.3
November	15.4	19.7	25.2	15.1	24.6
January	13.4	16.6	22.9	22.7	24.4
March	14.3	10.5	30.6	13.7	31.9
Cont. White Girls (O)					
September	14.8	15.0	23.2	21.4	25.6
November	15.2	15.7	23.9	19.1	26.1
January	16.1	16.4	31.0	23.0	13.5
March	21.5	15.4	26.9	14.8	21.4
Exp. White Boys (O)					
September	13.6	22.8	15.4	19.5	28.7
November	22.9	15.4	25.8	14.5	21.4
January	12.3	20.9	26.0	15.2	25.6
March	20.6	15.1	24.8	15.6	23.9
Cont. White Boys (O)					
September	16.3	15.6	29.6	19.9	28.6
November	15.4	16.1	24.6	22.1	21.8
January	14.9	16.0	23.2	24.9	21.0
March	15.8	16.4	29.0	22.5	16.3

APPENDIX D

UNACCOUNTED FOR VARIANCE AND % CONTRIBUTION OF ROTATED FACTORS TO THE TOTAL READING READINESS BATTERY VARIANCE FOR NEGRO GROUPS

	Rotated Factors				Unaccounted for Variance
	1	2	3	4	
Exp. Negro Girls					
September	15.9	24.8	22.0	14.7	22.6
November	18.3	18.4	25.5	12.9	24.9
January	13.0	16.3	28.1	14.9	27.7
March	15.6	15.8	25.1	22.9	20.6
Cont. Negro Girls					
September	24.1	19.1	16.2	15.4	25.2
November	16.3	16.1	24.0	30.2	13.4
January	15.5	20.3	23.8	15.4	25.0
March	15.8	14.8	23.1	23.9	22.4
Exp. Negro Boys					
September	15.1	13.0	18.1	26.6	27.2
November	15.1	19.3	22.2	16.2	27.2
January	15.4	15.4	24.1	22.8	22.3
March	14.6	15.5	22.9	22.2	24.8
Cont. Negro Boys					
September	16.0	15.1	18.3	28.4	22.2
November	16.1	21.2	23.7	15.0	24.0
January	15.5	24.1	24.6	15.6	20.2
March	14.5	13.6	20.6	20.0	31.3

APPENDIX E

UNACCOUNTED FOR VARIANCE AND % CONTRIBUTION OF ROTATED FACTORS TO THE TOTAL READING READINESS BATTERY VARIANCE FOR YOUNG NEGRO GROUPS

	Rotated Factors				Unaccounted for Variance
	1	2	3	4	
Exp. Negro Girls (Y)					
September	13.2	23.8	16.0	20.3	26.7
November	15.8	17.3	26.4	19.5	21.0
January	17.1	15.8	25.5	15.3	26.3
March	14.3	16.4	24.2	22.2	22.9
Cont. Negro Girls (Y)					
September	25.1	20.4	15.9	15.4	23.2
November	14.1	15.3	22.6	26.4	21.6
January	15.0	15.1	27.9	14.7	27.3
March	16.0	14.6	24.4	23.0	22.0
Exp. Negro Boys (Y)					
September	22.1	20.7	15.5	14.5	27.2
November	22.5	13.7	23.0	14.4	26.4
January	13.7	15.3	23.7	23.6	23.7
March	17.9	14.5	22.6	21.8	23.2
Cont. Negro Boys (Y)					
September	24.0	19.9	16.1	14.7	25.3
November	14.5	17.9	23.6	20.1	23.9
January	14.6	24.4	23.6	15.6	21.8
March	22.9	14.3	19.5	12.2	31.1

APPENDIX F

UNACCOUNTED FOR VARIANCE AND % CONTRIBUTION OF ROTATED FACTORS TO THE TOTAL READING READINESS BATTERY VARIANCE FOR OLD NEGRO GROUPS

	Rotated Factors				Unaccounted for Variance
	1	2	3	4	
Exp. Negro Girls (O)					
September	15.4	22.7	23.0	15.2	23.7
November	27.3	15.1	20.8	13.1	23.7
January	14.9	15.7	26.8	19.1	22.3
March	14.9	15.9	24.0	22.9	22.3
Cont. Negro Girls (O)					
September	23.6	15.9	16.1	19.8	24.6
November	16.4	16.2	23.5	35.8	8.1
January	15.3	21.7	23.8	15.2	24.0
March	15.7	14.9	21.4	24.4	23.6
Exp. Negro Boys (O)					
September	20.7	20.3	21.8	19.8	17.4
November	14.4	15.5	21.6	22.7	25.8
January	15.7	15.6	25.3	20.1	23.3
March	15.7	16.2	24.4	19.7	24.0
Cont. Negro Boys (O)					
September	16.4	26.0	14.8	21.0	21.8
November	16.3	22.4	25.9	14.7	20.7
January	15.5	23.6	25.0	14.6	21.3
March	14.9	18.7	19.4	20.9	26.1

APPENDIX G

NEWMAN-KEULS SEQUENTIAL RANGE TEST FOR INTERACTION TREATMENT X RACE

k = 4 means

Error sum of squares = 12477.902

df = 735

Error mean square = 16.977

	Means	N's
Control White (CW)	17.668	196
Experimental White (EW)	16.649	202
Experimental Negro (EN)	15.519	181
Control Negro (CN)	14.418	172

$$\bar{n} = \frac{k}{1/n_1 + 1/n_2 + 1/n_3 + 1/n_4} = 181.818$$

$$s_{\bar{y}} = \sqrt{\frac{16.977}{181.818}} = .306$$

$R_4 = 3.63 \times s_{\bar{y}} = 1.111$

$R_3 = 3.31 \times s_{\bar{y}} = 1.012$

$R_2 = 2.77 \times s_{\bar{y}} = .848$

Group	CN	EN	EW
CW	3.250	2.149	1.019
EW	2.231	1.130	
EN	1.101		

APPENDIX H

NEWMAN-KEULS SEQUENTIAL RANGE TEST FOR INTERACTION
RACE X SEX X AGE

k = 8 means

Error sum of squares = 12477.902

df = 735

Error mean square = 16.977

	Means	N's
White Girls, Young (WGY)	17.677	99
White Girls, Old (WGO)	17.521	94
White Boys, Old (WBO)	17.398	113
Negro Girls, Old (NGO)	16.022	89
White Boys, Young (WBY)	15.902	92
Negro Girls, Young (NGY)	15.168	95
Negro Boys, Young (NBY)	14.337	101
Negro Boys, Old (NBO)	14.324	68

$$\tilde{n} = \frac{8}{1/n_1 + 1/n_2 + 1/n_3 + 1/n_4 + \ldots\ldots + 1/n_8} = 90.909$$

$$s_{\bar{y}} \quad \sqrt{\frac{16.977}{90.909}} = .419$$

$R_8 = s_{\bar{y}} \text{ X } 4.29 = 1.798$

$R_7 = s_{\bar{y}} \text{ X } 4.17 = 1.747$

$R_6 = s_{\bar{y}} \text{ X } 4.03 = 1.689$

$R_5 = s_{\bar{y}} \text{ X } 3.86 = 1.617$

$R_4 = s_{\bar{y}} \text{ X } 3.63 = 1.521$

$R_3 = s_{\bar{y}} \text{ X } 3.31 = 1.387$

$R_2 = s_{\bar{y}} \text{ X } 2.77 = 1.161$

NEWMAN-KEULS SEQUENTIAL RANGE--Continued

Group	NBO	NBY	NGY	WBY	NGO	WBO	WGO
WGY	3.353	3.340	2.509	1.775	1.655	.279*	.156*
WGO	3.197	3.184	2.353	1.619	1.499	.123*	
WBO	3.074	3.061	2.230	1.496	1.376		
NGO	1.698	1.685	.854*	.120*			
WBY	1.578	1.565	.734*				
NGY	.844	.831*					
NBY	.013*						

Note.- Values above and to the left of * are significant at the .05 level.

APPENDIX I

CORRELATION MATRICES OF THE READING READINESS TESTS AND THE STANFORD READING MEDIAN FOR EXPERIMENTAL WHITE SUBJECTS

Variables		1	2	3	4	5	6	C
Sept.	1	1.000	.307	.274	.398	.343	.323	.342
	2		1.000	.292	.421	.419	.477	.500
	3			1.000	.394	.368	.279	.494
	4				1.000	.473	.400	.522
	5					1.000	.436	.511
	6						1.000	.421
	C							1.000
Nov.	1	1.000	.301	.239	.246	.323	.252	.362
	2		1.000	.379	.410	.340	.396	.426
	3			1.000	.681	.304	.475	.480
	4				1.000	.436	.511	.533
	5					1.000	.382	.421
	6						1.000	.370
	C							1.000
Jan.	1	1.000	.189	.315	.341	.154	.313	.427
	2		1.000	.388	.321	.272	.341	.321
	3			1.000	.658	.308	.425	.484
	4				1.000	.309	.318	.450
	5					1.000	.433	.294
	6						1.000	.406
	C							1.000
Mar.	1	1.000	.301	.387	.343	.376	.367	.438
	2		1.000	.253	.269	.288	.284	.355
	3			1.000	.619	.413	.459	.444
	4				1.000	.319	.320	.413
	5					1.000	.441	.340
	6						1.000	.347
	C							1.000

APPENDIX J

CORRELATION MATRICES OF THE READING READINESS TESTS AND THE STANFORD READING MEDIAN FOR CONTROL WHITE SUBJECTS

Variables		1	2	3	4	5	6	C
Sept.	1	1.000	.296	.108	.245	.151	.236	.250
	2		1.000	.233	.231	.352	.340	.342
	3			1.000	.572	.386	.357	.455
	4				1.000	.528	.428	.558
	5					1.000	.546	.479
	6						1.000	.368
	C							1.000
Nov.	1	1.000	.182	.156	.266	-.059	-.009	.322
	2		1.000	.127	.224	.127	-.012	.316
	3			1.000	.576	.173	.105	.534
	4				1.000	.314	-.010	.592
	5					1.000	.363	.146
	6						1.000	.098
	C							1.000
Jan.	1	1.000	.254	.347	.312	.314	.242	.404
	2		1.000	.124	.147	.097	.113	.063
	3			1.000	.643	.412	.323	.545
	4				1.000	.496	.423	.538
	5					1.000	.560	.482
	6						1.000	.384
	C							1.000
Mar.	1	1.000	.263	.311	.419	.276	.321	.442
	2		1.000	.320	.254	.289	.271	.243
	3			1.000	.706	.493	.445	.522
	4				1.000	.456	.439	.528
	5					1.000	.528	.498
	6						1.000	.500
	C							1.000

APPENDIX K

CORRELATION MATRICES OF THE READING READINESS TESTS AND THE STANFORD READING MEDIAN FOR EXPERIMENTAL NEGRO SUBJECTS

Variables		1	2	3	4	5	6	C
Sept.	1	1.000	.175	.025	.251	.244	.177	.401
	2		1.000	.494	.198	.148	.317	.061
	3			1.000	.306	.238	.141	.157
	4				1.000	.408	.362	.496
	5					1.000	.362	.366
	6						1.000	.274
	C							1.000
Nov.	1	1.000	.318	.222	.261	.243	.165	.321
	2		1.000	.376	.339	.248	.361	.452
	3			1.000	.552	.163	.222	.485
	4				1.000	.268	.367	.611
	5					1.000	.340	.319
	6						1.000	.320
	C							1.000
Jan.	1	1.000	.176	.212	.310	.181	.157	.332
	2		1.000	.155	.182	.252	.240	.381
	3			1.000	.588	.334	.334	.448
	4				1.000	.410	.311	.588
	5					1.000	.455	.447
	6						1.000	.328
	C							1.000
Mar.	1	1.000	.166	.255	.370	.251	.275	.349
	2		1.000	.142	.239	.246	.132	.312
	3			1.000	.602	.412	.356	.536
	4				1.000	.458	.368	.629
	5					1.000	.490	.512
	6						1.000	.397
	C							1.000

APPENDIX L

CORRELATION MATRICES OF THE READING READINESS TESTS AND THE STANFORD READING MEDIAN FOR CONTROL NEGRO SUBJECTS

Variables		1	2	3	4	5	6	C
Sept.	1	1.000	.130	.118	.369	.098	.272	.318
	2		1.000	.104	-.037	.360	.329	.246
	3			1.000	.214	.241	.193	.131
	4				1.000	.004	.215	.327
	5					1.000	.345	.016
	6						1.000	.232
	C							1.000
Nov.	1	1.000	.108	.184	.279	.052	.035	.328
	2		1.000	.187	.377	.219	.245	.367
	3			1.000	.595	.123	.091	.350
	4				1.000	.285	.152	.554
	5					1.000	.287	.173
	6						1.000	.225
	C							1.000
Jan.	1	1.000	-.107	.248	.273	.023	.007	.222
	2		1.000	.327	.385	.571	.443	.274
	3			1.000	.569	.258	.242	.414
	4				1.000	.322	.306	.589
	5					1.000	.371	.244
	6						1.000	.316
	C							1.000
Mar.	1	1.000	.146	.346	.276	.066	.118	.307
	2		1.000	.009	.360	.369	.195	.336
	3			1.000	.497	.099	.237	.446
	4				1.000	.236	.326	.650
	5					1.000	.394	.246
	6						1.000	.335
	C							1.000

APPENDIX M

MATERIALS AND PROCEDURES QUESTIONNAIRE

County ____________________ School ____________________ Teacher ____________________

MATERIALS AND PROCEDURES USED IN YOUR CLASSROOM

Please check below the materials and procedures which you use in your reading lessons, or in developing your pupils' reading skills while teaching other subjects.

Put an X in the Column which shows about how many days in the school year the item is used, in working with all or part of your class.

Many items may not be used at your grade level or in your school. For those not used, just leave the spaces blank.

Check approximate frequency if used:

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
A. READING MATERIALS					
1. Basic readers from one or more graded series............					
2. Supplementary readers from one or more reading series........................					
3. Children's story books (not part of a reading series.)....					
4. Special books for slower readers........................					
5. Children's magazines and newspapers like My Weekly Reader..					
6. Experience charts based on the children's activities or interests......................					

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
7. Library books from school or public library-...........					
8. Special books for advanced readers......................					
9. Children participate in Book Club? Yes ___ No ___........					
10. Content Books (science, social science, health).............					
11. Other: (describe) ____________________________ ____________________________ ____________________________					

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
B. WORKBOOKS AND EXERCISES					
1. Reading readiness workbooks and exercises for children not yet reading............					
2. Graded workbooks which accompany basic readers....					
3. Special Phonics workbooks...					
4. Workbooks or exercises prepared by the teacher.......					
5. Dittoed Workbooks or exercises.................					
6. "Reading laboratory" kits...					
7. Other: (describe)					

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
C. AUDIO-VISUAL ACTIVITIES					
1. Reading machines for improving speed or perception.....					
2. Films or filmstrips specifically for reading or readiness instruction...........					
3. Films or filmstrips for other subjects or general enrichment.......................					
4. School television programs related to reading..........					
5. School television programs for other subjects..........					
6. Field trips to broaden experience of the children.......					
7. Flannel-boards................					
8. Pictures (story-telling)....					
9. Puppets.......................					
10. Reading poetry to children (by teacher)................					
11. Reading stories to children (by teacher)................					
12. Listening to records (auditory training)..............					
13. Listening to records (story material)....................					
14. Using tape recorder..........					
15. Overhead projector...........					
16. Tachistoscope of Tach-X......					

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
17. Other: (describe) ____________________ ____________________ ____________________					

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
D. TRAINING FOR WORD RECOGNITION					
1. Learning new words as wholes from flashcards, blackboard, or readers....................					
2. Learning to sound out words from letters and letter-combinations.................					
3. Learning to use context or picture clues to recognize new words......................					
4. Noticing similar sounds in words and relating them to the letters....................					
5. Using the outline shape of the word as a means of recognition........................					
6. Noticing special features like tall letters or double letters as means of word recognition.					
7. Systematic learning of rules for sounding letters and letter-combinations..........					
8. Finding smaller words in longer ones....·....................					
9. Learning to divide words into syllables......................					
10. Learning capitalized and lower case forms of same word.					
11. Plurals and endings..........					
Recognizing and reading:					
12. Contractions....................					

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
Recognizing and Reading:					
13. Possessives..................					
14. Abbreviations................					
15. Word recognition games.......					
16. Compound words...............					
17. Other:					
______________________					
______________________					
______________________					

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
E. WORD MEANING AND COMPREHENSION					
1. Relating words to pictures or to objects..................					
2. Dramatizing word meanings....					
3. Children use dictionaries to find word meanings..........					
4. Reading silently and retelling in their own words what they read.......................					
5. Children write about own experiences or original stories.....................					
6. Learning about words with similar or opposite meanings..					
7. Learning meanings of suffixes as clues to word meaning (ing, ed, ly).....................					
8. Leaning to read in phrases or thought units to help get meaning (in oral reading)....................					
9. Children arrange picture sequence and tell story.....					
10. Other:					
______________________________					
______________________________					
______________________________					

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
F. STUDY AND CRITICAL SKILLS					
1. Using reference books to locate information					
2. Children criticize stories or articles, examine motives, facts or conclusions					
3. Learning to recognize author's purpose and point of view					
4. Children report on books they read-					
5. Learning the alphabet as aid to reading					
6. Learning alphabet as aid to writing					
7. Children help make & read charts					
8. Children make scrapbooks					
9. Anticipating outcomes of stories					
10. Recounting sequence of events after reading					
11. Reading Children's own stories					
12. Teacher writes story as child dictates					
13. Other:					
______________________________					
______________________________					
______________________________					

	All or most days in the year	2-3 times a week	Once a week	Several times a year	Once or twice a year
G. ORAL READING ACTIVITIES					
1. Oral reading from basic readers......................					
2. Oral reading by children from books of their own choice..................					
3. Learning and reciting poetry......................					
4. Choral reading................					
5. Oral reading in a dramatization......................					
6. Other:					
______________________________					
______________________________					
______________________________					

H. CLASSROOM ORGANIZATION

1. What type of classroom organization do you use most frequently? Double XX your most frequent practice; single X other arrangements used sometimes.

    1. Mainly individual instruction ________
    2. Mainly instruction in groups based on reading ability. ________
    3. Mainly instruction in groups based on social factors, interests, or other factors not involving reading ability. ________
    4. Mainly by instructing the whole class ________

2. How many reading groups do you commonly have in your class? ________

3. About how many reading groups do you personally work with each day? ________

4. How many days per week do you usually give reading lessons to your class? ________

5. Approximately how many minutes per day are given to the teaching of reading or readiness training? (Not counting the time in teaching reading in other subjects) ________

6. Do you teach reading skills in connection with other subjects, as science, social studies? If yes, in what subjects ________

    ____

7. About how many minutes per day are spent in teaching reading skills in these content subjects? ________________________

I. THE SPECIAL READINESS PROGRAM

If you followed the plan of our experiment, some of your children received special readiness training for extended periods before being introduced to training in reading.

1. About how much total time each day did you devote to this special readiness training? ____________

    a. to blackboard exercises ____________

    b. to seatwork pages ____________

2. How many special readiness groups did you find it necessary to form? One for visual perception?______ One for auditory training? ________ or one group for both? ___________

3. Was the time spent about the same each day for each of the groups? ________(If you had only one readiness group, skip this question) If not, give details ____

____

____

4. The children selected for the special readiness training were chosen on the basis of their performances on the readiness tests. Did you find that some children were, in your opinion, ready for reading instruction some time before you were asked to begin this training?__________ If yes, please give the names and sex of those children who were ready for reading before the tests found them ready.

During the first training period (September to November)

Name	Sex (M or F)

Name	Sex (M or F)

During the 2nd training period (November to January)

Name	Sex (M or F)

During the third training period (January to March)

Name	Sex (M or F)

Name	Sex (M or F)
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________

5. Were you asked to begin reading instruction with some children, because of their test scores, before you felt they were really ready? ________ If yes, please give the names and sex of those children who were started in reading instruction before they were really ready.

During the first Training period (September to November)

Name	Sex (M or F)
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________
____________________	__________

During the 2nd training period (November to January)

Name	**Sex (M or F)**

During the third training period (January to March)

Name	**Sex (M or F)**

At the end of the third training period (About March 15th)

Name	Sex (M or F)

6. What is your opinion of the blackboard readiness exercises for visual perception?

7. About how often did you use these blackboard exercises?
Everyday__________2-3 times a week_________ Once a week __________

8. For about how many minutes did you carry on these blackboard exercises?
____

What is your opinion of the seatwork pages for readiness training?

9. Those in Visual Discrimination? ______________________________

10. Those for Visual Motor Skills? ______________________________

____

____

11. Those [illegible]inning Sounds? ______________________________

____

____

12. Those on Rhyming? ______________________________

____

____

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